

SPECS-IN-TACT

DEPARTMENT OF THE NAVY
NAVAL FACILITIES
ENGINEERING COMMAND
GUIDE SPECIFICATION
NFGS-16530 (March 1985)
Amendment 1 (May 1987)

Superseding
NFGS-16530 (February 1981)

SECTION 16530

EXTERIOR LIGHTING
05/87

NOTE: This guide specification covers lighting system requirements for exterior installations. This specification is oriented toward High-Intensity-Discharge (HID), particularly High Pressure Sodium (HPS) and Low Pressure Sodium (LPS) luminaires. HPS and LPS lamps are currently the most efficient of any of the available light sources and are among those having the longest life. With improvements in color rendition and development of solid-state ballasts approaching, HPS is expected to be the predominant light source of the future.

This specification does not cover all possible methods or requirements for exterior lighting; therefore, designer should add special information required to suit a specific project. Industry publications exist to aid the designer in choosing the best lighting system for the project. One such publication is the IES RP-8, "Recommended Practice for Roadway Lighting."

The extent and location of the work to be accomplished and wiring and equipment necessary for a complete installation shall be indicated on the project drawings.

NOTE: See Note A located at rear of text.

PART 1 GENERAL

1.1 SUMMARY

NOTE: This article is not used by the Naval Facilities Engineering Command except in specialized cases. Delete this article when editing for project specifications.

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	Low-Pressure Sodium Lamps (Multiple-Supply Type)
ANSI C136.3	1984 Roadway Lighting Equipment - Luminare Attachments
ANSI C136.13	1979 Metal Brackets for Wood Poles Used in Roadway Lighting
ANSI O5.1	1979 Specifications and Dimensions for Wood Poles
<p>AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM) 1916 RACE STREET PHILADELPHIA, PA 19103 (215) 299-5585</p>	
ASTM A123	1984 (Hot-Dip Galvanized) Coatings on Iron and Steel Products
ASTM A153	1982 Zinc Coating (Hot-Dip) on Iron and Steel Hardware
ASTM A416	1985 Uncoated Seven-Wire Stress-Relieved Steel Strand for Prestressed Concrete
ASTM A421	1980 (Rev. 1985) Uncoated Stress-Relieved Steel Wire for Prestressed Concrete
ASTM B108	1985 (Rev. A) Aluminum-Alloy Permanent Mold Castings
ASTM C33	1986 Concrete Aggregates
ASTM C150	1985 (Rev. A) Portland Cement
ASTM C330	1985 Lightweight Aggregates for Structural Concrete
ASTM D1242	1956 (Rev. 1981) Resistance of Plastic Materials to Abrasion
ASTM D1435	1975 (Rev. 1979) Outdoor Weathering of Plastics
ASTM D2565	1985 Operating Xenon Arc-Type (Water-Cooled) Light-Exposure Apparatus With and Without Water for Exposure of Plastics
ASTM G23	1981 Operating Light-Exposure Apparatus (Carbon-Arc Type) With and Without Water for Exposure of Nonmetallic Materials
ASTM G53	1984 Operating Light- and Water-Exposure Apparatus (Fluorescent UV-Condensation Type)

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for Exposure of Nonmetallic Materials

AMERICAN WOOD-PRESERVERS' ASSOCIATION (AWPA)
108 HARLEY COURT
P.O. BOX 849
STEVENSVILLE, MD 21666
(301) 643-4163

AWPA C4

1984 Poles - Preservative Treatment by
Pressure Processes

ILLUMINATING ENGINEERING SOCIETY (IES)
PUBLICATIONS DEPARTMENT
345 EAST 47TH STREET
NEW YORK, NY 10017
(212) 705-7920

IES LHBK

Lighting Handbook, Reference (1984) and
Application (1981) Volumes

NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION (NEMA)
2101 L STREET, N.W., SUITE 300
WASHINGTON, DC 20037
(202) 457-8474

NEMA ICS2

1983 (Rev. 2 1985) Industrial Control
Devices, Controllers and Assemblies

NEMA ICS6

1983 (Rev. 3 1986) Enclosures for
Industrial Controls and Systems

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)
PUBLICATIONS DEPARTMENT
BATTERYMARCH PARK
QUINCY, MA 02269
(617) 770-3000

NFPA 70

1987 National Electrical Code (NEC)

PRESTRESSED CONCRETE INSTITUTE (PCI)
201 NORTH WELLS, SUITE 1410
CHICAGO, IL 60606
(312) 346-4071

PCI JR275-5/6

1983 Guide for Design of Prestressed
Concrete Poles

UNDERWRITERS LABORATORIES, INC. (UL)
333 PFINGSTEN ROAD
NORTHBROOK, IL 60062
(312) 272-8800

UL 773

1982 (Rev. 1986) Plug-In, Locking
Type Photocontrols for Use With Area

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Lighting, February

UL 773A

1982 Nonindustrial Photoelectric
Switches for Lighting Control

UL 1029

1980 (Rev. 1983) High-Intensity-Discharge
Lamp Ballasts, May

UL 1572

1984 (Rev. 1986)
High-Intensity-Discharge Lighting Fixtures,
July

1.3 GENERAL REQUIREMENTS

Section 16011, "Electrical General Requirements," applies to this section, with the additions and modifications specified herein. Materials not considered to be lighting equipment or lighting fixture accessories are specified in Section 16301, "Underground Electrical Work" [Section 16302, "Overhead Electrical Work"], [and Section 16402, "Interior Wiring Systems"]. [Lighting fixtures and accessories mounted on exterior surfaces of buildings are specified in Section 16510, "Interior Lighting."]

1.4 SUBMITTALS

NOTE: In projects using the Contractor Quality Control System, add the words, "Submit to the Contracting Officer", to submittals deemed sufficiently critical or complex or aesthetically significant to merit approval by the Government.

NOTE: For each submittal required, determine who is to approve the submittal and insert requirements appropriate to the type of contract (CQC or Non CQC) and the type of submission to be made.

Data, detail drawings, and reports shall employ the terminology, classifications, and methods prescribed by the IES LHBK, Lighting Handbook, as applicable, for the lighting system specified.

1.4.1 SD-17, Manufacturer's Catalog Data

Manufacturer's Data: When data that describe more than one type, size, model, or item is submitted, clearly mark the data to indicate which type, size, model, or item is being provided. Data shall be sufficient to show conformance to specified requirements.

- a. Luminaires
- b. Poles and brackets
- c. [Photocell switch]
- d. [Time switch]

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- e. [Lighting contactor]
- f. [_____]

1.4.2 SD-31, Detail Drawings

Shop Drawings:

- a. Luminaires: Include dimensions, accessories, and installation and construction details. Photometric data, including Zonal lumen data, average and minimum ratio, aiming diagram and [computerized] candlepower distribution data shall accompany shop drawings.
- b. Poles: Include dimensions, wind load determined in accordance with AASHTO LTS2, pole deflection, pole class, and other applicable information.

1.4.3 SD-50, Samples

 NOTE: Certified test reports and samples generally involve additional cost. If they are not essential to the specific application, they should be deleted. When computerized candlepower data are required, specify the number of angles, planes, and light distribution. Retain test reports when specifying fiberglass poles until applicable industry standards are published.

[One sample for each of the following:]

- a. Luminaires (one sample for each type) [complete with lamp and ballast].
- [b. _____.]

1.4.4 SD-70, Test Reports

Certified Test Reports:

 NOTE: Certified test reports and samples generally involve additional cost. If they are not essential to the specific application, they should be deleted. When computerized candlepower data are required, specify the number of angles, planes, and light distribution. Retain test reports when specifying fiberglass poles until applicable industry standards are published.

[a. Luminaries:

- (1) Computerized horizontal illumination levels in footcandles at ground level, taken every [10] [20] [_____] feet. Include

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average maintained footcandle level and maximum/minimum ratio.

- (2) Distribution data according to IES classification type as defined in IES LHBK Lighting Handbook.]

[b. Fiberglass Poles:

- (1) Weatherometer Tests: Perform according to ASTM D1435, ASTM D2565, ASTM G23, or ASTM G53.
- (2) Abrasion Test: Perform according to ASTM D1242, Method A (loose abrasive). Test shall indicate that abrasion of surface layer does not cause fiber ends to be exposed.
- (3) Flexural Strength and Deflection Test: Test loading shall be as a cantilever beam with pole butt as fixed end and a force simulating wind load at the free end.]

Field Test Reports: Submit test results as stated in paragraph entitled "Field Tests."

PART 2 PRODUCTS

2.1 LUMINAIRES

 NOTE: Include luminaire schedule on drawings and indicate pertinent information; i.e., mounting, lamps, ballasts, voltage, etc. See sample schedule on Sketch No. 16530-99. Luminaire, ballast, and lamp design and technology have advanced rapidly in recent years; ensure a luminaire is currently available before specifying. Light distribution and brightness characteristics can be helpful for comparison, selection, and special applications of exterior luminaires.

 NOTE: See Note B located at rear of text.

UL 1572. Provide luminaires as indicated. Provide luminaires complete with lamps of the number, type, and wattage indicated. The details, shapes, and dimensions are indicative of the general type desired, but are not intended to restrict selection to luminaires of any particular manufacturer. Luminaires of similar designs and equipment [, light distribution and brightness characteristics,] and of equal finish and quality will be acceptable as approved.

2.1.1 Lamps

 NOTE: See Note C located at rear of text.

[Provide the type and wattage indicated.]

2.1.1.1 [High-Pressure Sodium Lamps

[35-watt conforming to ANSI C78.1358] [50-watt conforming to ANSI C78.1359] [70-watt conforming to ANSI C78.1353] [100-watt conforming to ANSI C78.1354] [150-watt, 55-volt conforming to ANSI C78.1355] [250-watt conforming to ANSI C78.1351] [400-watt conforming to ANSI C78.1350] [1000-watt conforming to ANSI C78.1352].]

2.1.1.2 [Low-Pressure Sodium Lamps

ANSI C78.41.]

2.1.1.3 [Metal-Halide Lamps

[400-watt conforming to ANSI C78.1375] [1000-watt conforming to ANSI C78.1376].]

2.1.2 Ballasts for High-Intensity-Discharge (HID) Luminaires

NOTE: See Note D located at rear of text.

UL 1029 and ANSI C82.4, and shall be constant wattage autotransformer (CWA) or regulator, high power factor type. Ballasts shall be designed to operate on the voltage system to which they are connected. Provide single lamp ballasts with a minimum starting temperature of minus 30 degrees Celsius (C). Ballasts shall be constructed so that open circuit operation will not reduce their average life. [High Pressure Sodium (HPS) ballasts shall have a solid state igniter/starter with an average life in the pulsing mode of 10,000 hours at the intended ambient temperature. Igniter case temperature shall not exceed 90 degrees C in any mode. Average life is defined as the time after which 50 percent will have failed and 50 percent will have survived under normal conditions.]

2.2 LIGHTING CONTACTOR

NEMA ICS2, electrically operated, mechanically held contactor rated [____ volts, ____ amperes, ____ -pole] [as indicated]. Provide in NEMA [4] [____] enclosure conforming to NEMA ICS6. Contactor shall have silver alloy double-break contacts and coil clearing contacts and shall require no arcing contacts. [Provide contactor with [hand-off-automatic] [on-off] selector switch.] [Contactor shall be hermetically sealed.]

2.3 TIME SWITCH

NOTE: See Note E located at rear of text.

Astronomic dial type arranged to turn "ON" at sunset, and turn "OFF" at predetermined time between 8:30 p.m. and 2:30 a.m. or sunrise,

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automatically changing the settings each day in accordance with seasonal changes of sunset and sunrise. Provide switch with automatically wound spring mechanism to maintain accurate time for a minimum of 15 hours following power failure. Provide time switch with a manual on-off bypass switch. Housing for the time switch shall be surface mounted, NEMA [3R] [] enclosure conforming to NEMA ICS6.

2.4 PHOTOCCELL SWITCH

NOTE: See Note E located at rear of text.

UL 773 or UL 773A, hermetically sealed cadmium-sulphide cell rated _____ volts ac, 60 hertz with single-throw contacts rated [1000] [] watts, and _____ volts. Mount switch [in a cast weatherproof aluminum housing with swivel arm designed to mount on or beside each luminaire] [integral to the luminaire] [in a high-impact-resistant, noncorroding and nonconductive molded plastic housing with an EEI-NEMA locking-type receptacle]. The switch shall turn on below 3 footcandles and off at 3 to 10 footcandles. A time delay shall prevent accidental switching from transient light sources. Mount a directionallens in front of the cell to prevent fixed light sources from creating a turnoff condition. SD-17, Aim switch according to manufacturer's recommendations.

2.5 POLES

NOTE: This specification does not cover decorative poles or high-mast lighting systems. The poles, luminaire mounting assemblies, and lowering mechanisms for high-mast lighting are specially fabricated and should be individually designed to suit a specific project. Pole specifications for a high-mast system should, as a minimum, include wind loading and ultimate strength meeting the loading requirements of the AASHTO. Structural Supports for Highway Signs, Luminaires and Traffic Signals.

Provide poles designed for wind loading of [100] [] miles per hour determined in accordance with AASHTO LTS2 while supporting luminaires having effective projected areas indicated. Poles shall be [embedded] [anchor]-base type designed for use with [underground] [overhead] supply conductors.

2.5.1 Concrete Poles

Provide concrete poles conforming to PCI JR275-5/6 and as follows:

2.5.1.1 Steel Reinforcing

Prestressed concrete pole shafts shall be reinforced with steel prestressing members. The design shall provide internal longitudinal loading by either pretensioning or post tensioning of the longitudinal

reinforcing members.

2.5.1.2 Primary Reinforcing

Primary (Longitudinal) reinforcing steel used in prestressed concrete poles shall be high strength, stress relieved uncoated wire type, either stranded or solid in accordance with ASTM A416 or ASTM A421.

2.5.1.3 Supplementary Reinforcing

Supplementary reinforcing steel, if required, may be of either high strength or of medium strength steel in accordance with ASTM A416 (75,000 psi min).

2.5.1.4 Tensioned Reinforcing

The primary reinforcement steel used for a prestressed concrete pole shaft shall be tensioned to 60 percent to 70 percent of its ultimate strength. The amount of reinforcement shall be such that when reinforcement is tensioned to 70 percent of its ultimate strength, the total resultant tensile force does not exceed the minimum section compressive strength of the concrete.

2.5.1.5 Coating and Sleeves For Reinforcing Members

Reinforcing steel shall be spaced and secured so as to insure a minimum concrete coverage of 1/2 inch thickness. Where minimum internal coverage cannot be maintained next to required core openings, such as handhole and wiring inlet, the reinforcing shall be protected with a vaporproof non-corrosive sleeve over the length without the 1/2-inch concrete coverage. Each steel reinforcing member which is to be post-tensioned shall have a non-migrating slipper coating applied prior to the addition of concrete to insure the uniformity of stress throughout the length of such member.

2.5.1.6 Cement Mix

The cement used for the concrete shall be portland cement in accordance with ASTM C150. Types I or III shall be used for general service. However, if resistance to sulfates is necessary, portland cement types II or V may be substituted.

2.5.1.7 Aggregate

The aggregate use for the concrete shall be fine grade, either natural or artificial. Natural aggregate shall conform to ASTM C33, fine grade except that five to ten percent shall be retained by a number 4 sieve. Artificial aggregates shall conform to applicable sections of ASTM C33 and ASTM C330 regarding size and strength. Either type shall have been proven for the following:

- a. Moisture absorption, two percent maximum of weight.
- b. Good resistance to abrasion.

2.5.1.8 Water

The water used for concrete shall be clean and free of injurious quantities of substances deleterious to concrete or to prestressing steel.

2.5.1.9 Strength Requirement

SD-11, The proportions of cement, aggregate, and water for the concrete, and the processing and curing of the concrete, shall be such as to develop a minimum compressive strength of 3500 psi before stress transfer in prestressing. Further natural curing shall achieve a 28-day compressive strength of 7000 psi. Poles shall not be subjected to severe temperature changes during the curing period.

2.5.1.10 Shaft Preparation

The completed prestressed concrete pole shaft shall be clean, smooth, and free of surface voids and internal honeycombing.

2.5.2 Aluminum Poles

Provide aluminum poles manufactured of corrosion resistant aluminum alloys conforming to AASHTO LTS2 for Alloy 6063-T6 or Alloy 6005-T5 for wrought alloys and Alloy 356-T4 (3,5) for cast alloys. Poles shall be seamless extruded or spun seamless type. Provide a pole grounding connection designed to prevent electrolysis when used with copper ground wire.

2.5.3 Steel Poles

AASHTO LTS2. Provide steel poles having minimum 11-gage steel with minimum yield/strength of 48,000 psi and [hot-dipped galvanized per ASTM A123] [iron-oxide primed] factory finish. Provide a pole grounding connection designed to prevent electrolysis when used with copper ground wire.

2.5.4 Wood Poles

ANSI O5.1 of [Southern Yellow Pine] [Douglas Fir] [_____]. Poles shall be gained, bored, and roofed before treatment. Poles shall be treated full length with chromated copper arsenate (CCA) or Ammoniacal Copper Arsenate (ACA) according to AWPA C4.

2.5.5 Fiberglass Poles

NOTE: Committees in ASTM and ANSI/NEMA are presently working on standards for fiberglass poles. The standards are expected to be published in 1986. At that time, some of the detailed specification requirements may be eliminated in favor of reference to the industry standards.

Designed specifically for supporting luminaires and having factory-formed

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cable entrance and handhole. Resin color shall be [dark bronze] [as indicated] [_____], and pigment shall provide uniform coloration throughout entire wall thickness. The finish surface shall be pigmented polyurethane having a minimum thickness of 3/4 mil. Polyurethane may be omitted if the surface layer of the pole is inherently ultraviolet inhibited. Coating shall not have visible chalking, checking, or change in strength after a minimum of 1500 hours of continuous light exposure testing in a light-exposure apparatus (Weatherometer). Abrasion of surface layer shall not cause fiber ends to be exposed. The maximum pole deflection (horizontal displacement as a percent of mounting height) shall not exceed 15 percent when loaded according to AASHTO LTS2. Safety factor for full wind load shall be minimum of 2 to 1.

2.6 BRACKETS AND SUPPORTS

ANSI C136.3 [, except ANSI C136.13 for brackets and supports for wood poles]. Pole brackets shall be not less than 1-1/4-inch [galvanized steel pipe] [aluminum] secured to pole. Slip-fitter or pipe-threaded brackets may be used, but brackets shall be coordinated to the luminaires provided, and all brackets for use with one type of luminaire shall be identical. Brackets for pole-mounted street lights shall correctly position the luminaire no lower than the mounting height indicated. In no case shall the brackets be less than 24 feet above the street. Special mountings or brackets shall be as indicated and shall be of metal which will not promote galvanic reaction with the luminaire head.

2.7 ANCHOR BASE ASSEMBLIES

Anchor bolts shall be steel rod having a minimum yield strength of 50,000 psi; the top 12 inches of the rod shall be galvanized per ASTM A153. [Anchor bases for steel poles shall be structural quality hot-rolled carbon steel plate having a minimum yield strength of 36,000 psi.] [Anchor bases for aluminum poles shall be cast from 356-T6 aluminum alloy per ASTM B108.]

2.8 [INSTANT RESTRIKE DEVICE

NOTE: Select the applicable paragraph(s) from the following:

NOTE: Specify instant restrike devices or auxiliary quartz system for luminaires where the extinguishing of HID lamps caused by momentary power interruptions is unacceptable for safety or security reasons. The only available size for HPS lighting is 150-watt, 120-volt.

UL listed, solid-state potted module, suitable for mounting inside the luminaire. Maximum surface temperature of metal mounting surface shall not exceed 80 degrees C. Instant restrike device shall be compatible with mogul-based HPS lamps, ballasts and lamp sockets up to 150 watts. Restrike

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range shall be 105 to 130 volts ac. Voltage shall not exceed 250 volts peak or 150 volts ac rms.]

[AUXILIARY INSTANT-ON QUARTZ SYSTEM

NOTE: Committees in ASTM and ANSI/NEMA are presently working on standards for fiberglass poles. The standards are expected to be published in 1986. At that time, some of the detailed specification requirements may be eliminated in favor of reference to the industry standards.

UL listed, automatically switched instant-on [150] [250]-watt quartz lamp. Quartz lamp shall come on when the luminaire is initially energized and immediately after a momentary power outage and shall remain on until HID lamp reaches approximately 60 percent light output. Wiring for quartz lamp shall be internal to the ballast and shall be independent of the incoming line voltage to the ballast.]

PART 3 EXECUTION

3.1 INSTALLATION

ANSI C2, NFPA 70, and to the requirements specified herein.

3.1.1 [Wood Poles

NOTE: Select the applicable paragraph(s) from the following:

NOTE: Poles longer than 40 feet and poles set in swampy or rocky soil will require different settings or foundations than those set in average bearing soils. Consult pole manufacturer and structural engineer for proper setting or foundation requirements.

Stack poles stored for more than 2 weeks on creosoted or decay-resisting skids arranged to support the poles without producing noticeable distortion. Pile poles to permit free circulation of air; the bottom poles of the piles shall be at least 1 foot above ground level or any growing vegetation. Do not permit decayed or decaying wood to remain underneath stored poles. Do not drag treated poles along the ground. Do not use pole tongs, cant hooks, and other pointed tools capable of producing indentation more than 1 inch in depth in handling the poles. Do not apply tools to the groundline section of any pole. The groundline section is that portion between 1 foot above and 2 feet below the groundline.]

[Concrete Poles

NOTE: Poles longer than 40 feet and poles set in swampy or rocky soil will require different settings or foundations than those set in average bearing soils. Consult pole manufacturer and structural engineer for proper setting or foundation requirements.

SD-75, Install according to pole manufacturer's instructions.]

[Fiberglass Poles

NOTE: Poles longer than 40 feet and poles set in swampy or rocky soil will require different settings or foundations than those set in average bearing soils. Consult pole manufacturer and structural engineer for proper setting or foundation requirements.

SD-75, Install according to pole manufacturer's instructions.]

[[Aluminum] [Steel] Poles

NOTE: Poles longer than 40 feet and poles set in swampy or rocky soil will require different settings or foundations than those set in average bearing soils. Consult pole manufacturer and structural engineer for proper setting or foundation requirements.

Provide anchor bases with galvanized steel anchor bolts, threaded at the top end and bent 90 degrees at the bottom end. Provide galvanized nuts, washers, and ornamental covers for anchor bolts. Concrete for anchor bases, polyvinyl chloride (PVC) conduit ells, and ground rods shall be as specified in Section 16301, "Underground Electrical Work." Thoroughly compact backfill with compacting arranged to prevent any pressure between conductor, jacket, or sheath and the end of conduit ell. Adjust poles as necessary to provide a permanent vertical position with the bracket arm in proper position for luminaire location. [After installation, paint the exposed surfaces of steel poles with two finish coats of [exterior oil paint of a color as indicated] [aluminum paint].]

3.1.2 Pole Setting

[Depth shall be as indicated.] [Poles in straight runs shall be in a straight line. Dig holes large enough to permit the proper use of tampers to the full depth of the hole. Place backfill in the hole in 6-inch maximum layers and thoroughly tamp. Place surplus earth around the pole in a conical shape and pack tightly to drain water away.]

3.2 GROUNDING

Ground noncurrent-carrying parts of equipment [including metal poles] as specified in Section 16301, "Underground Electrical Work." Where the copper grounding conductor is connected to a metal other than copper, provide specially treated or lined connectors suitable for this purpose.

3.3 FIELD TESTS

[The Government will] [The Contractor shall] provide electric power required for field tests.

3.3.1 Operating Test

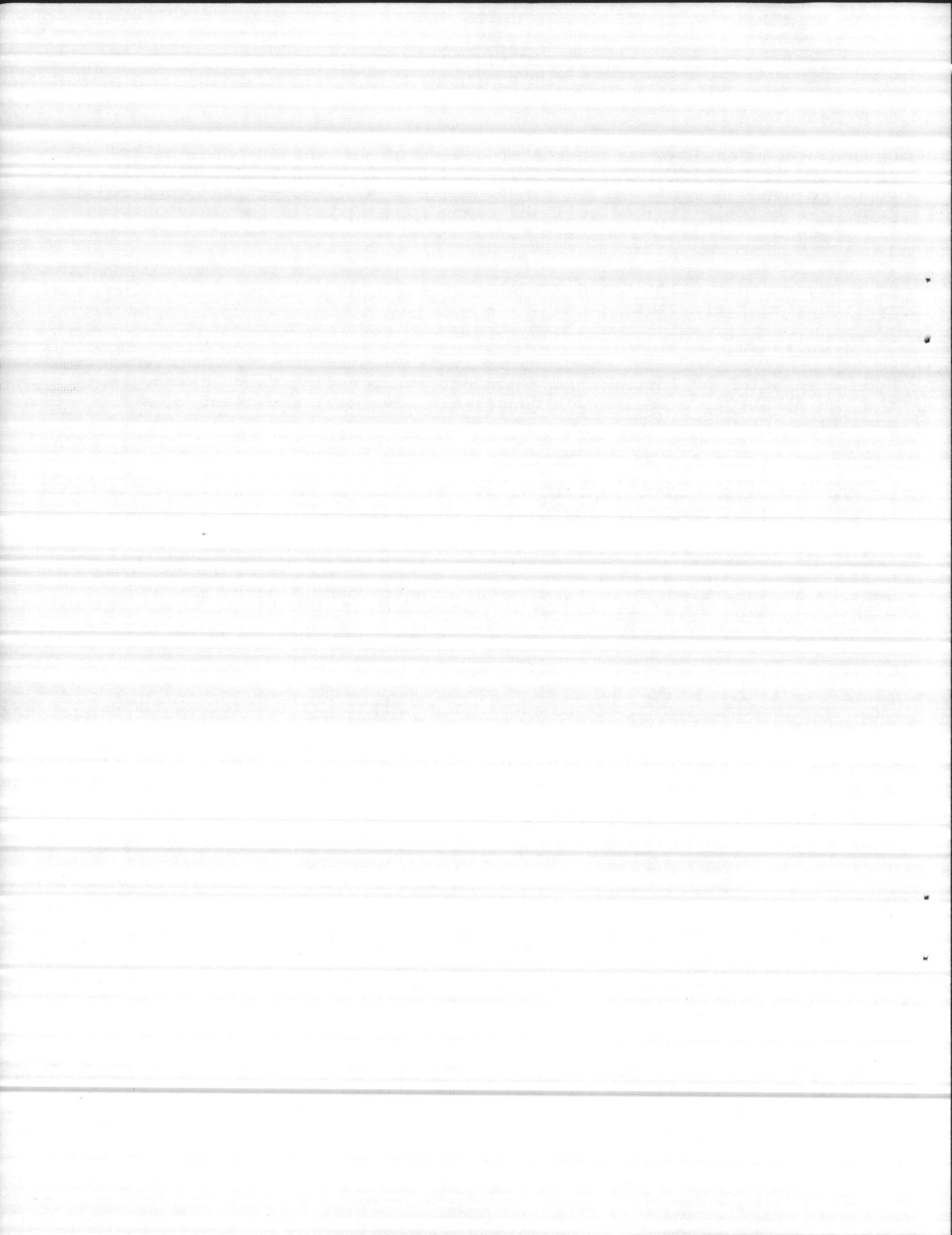
Upon completion of installation, conduct an operating test to show that the equipment operates in accordance with the requirements of this specification section.

3.3.2 Insulation Resistance Test

Perform as specified in Section 16301, "Underground Electrical Work," both before and after connection of fixtures and equipment.

3.3.3 Ground Resistance Tests

Perform as specified in Section 16301, "Underground Electrical Work."



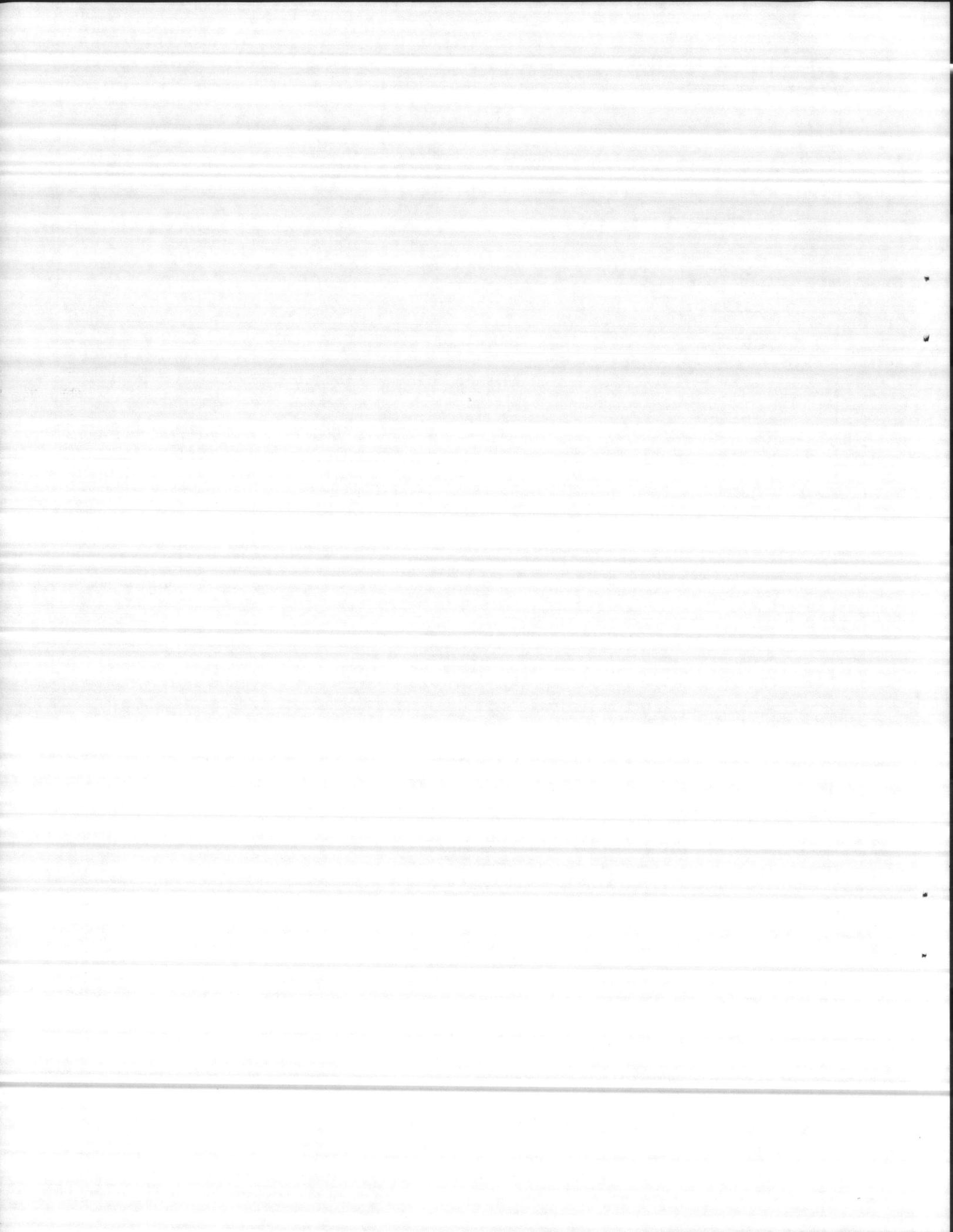
INDEX DATE: MARCH 1985

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SKETCH NUMBER

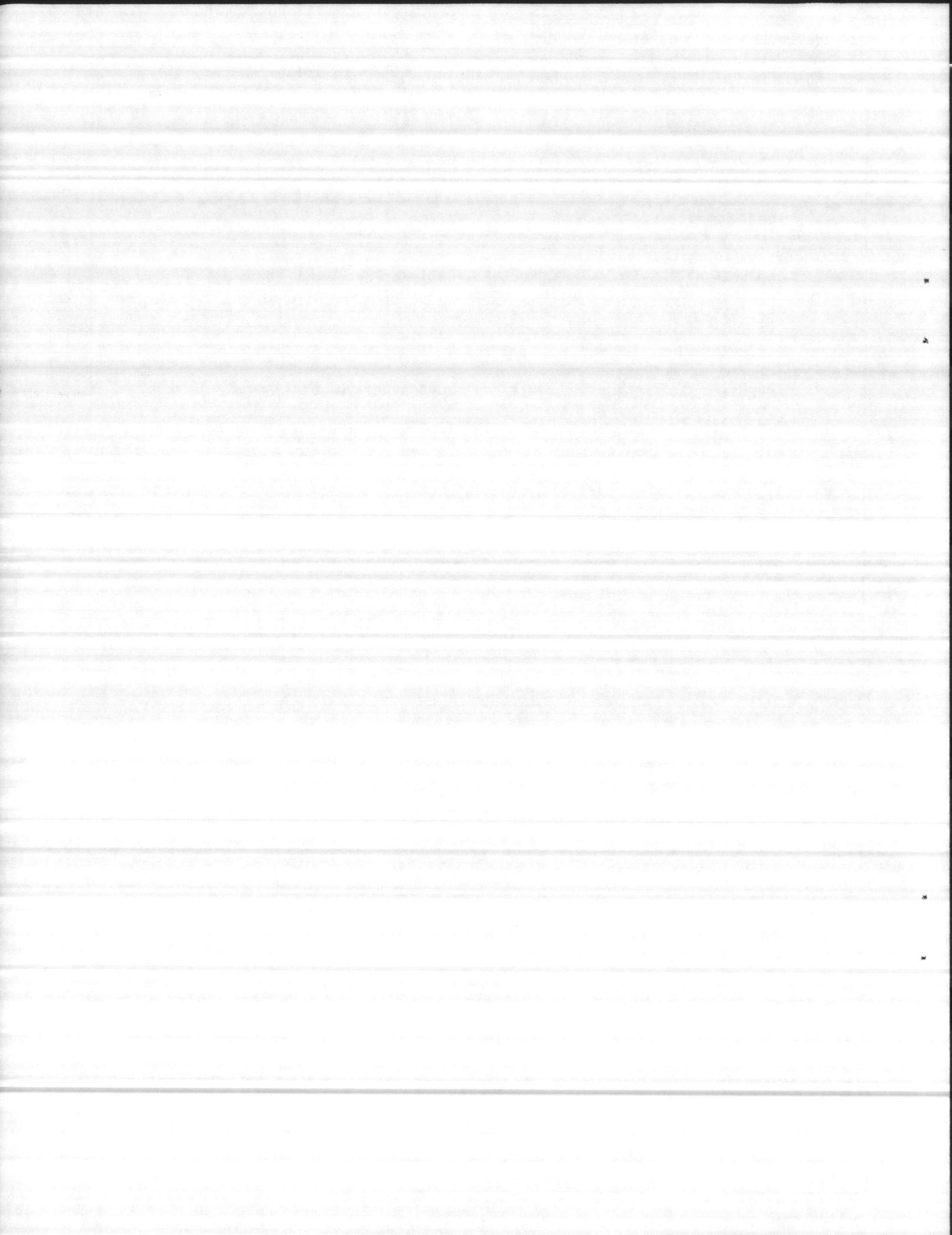
TITLE

16530-1	Roadway and Area Light
16530-2	Floodlight
16530-3	Floodlight and Sports Light
16530-4	Roadway and Area Light
16530-5	Sports and Area Light
16530-6	Roadway and Area Light Cutoff Luminaire
16530-7	Roadway and Parking Area Luminaire (L.P.S.)
16530-8	Area Light (Architectural)
16530-9	Round Architectural Post Top Area Light
16530-10	Square Architectural Post Top Area Light
16530-11	Area Light (Vertical Lamp)
16530-12	Reserved for Future Exterior Luminaires
16530-13	Reserved for Future Exterior Luminaires
16530-14	Reserved for Future Exterior Luminaires
16530-15	Reserved for Future Exterior Luminaires
16530-16	Reserved for Future Exterior Luminaires
16530-17	Reserved for Future Exterior Luminaires
16530-18	Reserved for Future Exterior Luminaires
16530-19	Reserved for Future Exterior Luminaires
16530-20	Fiberglass Pole, Direct Set Tenon Mount
16530-21	Fiberglass Pole, Direct Set Mast Arm Mount
16530-22	Concrete Pole, Direct Set Tenon Mount
16530-23	Concrete Pole, Direct Set Mast Arm Mount



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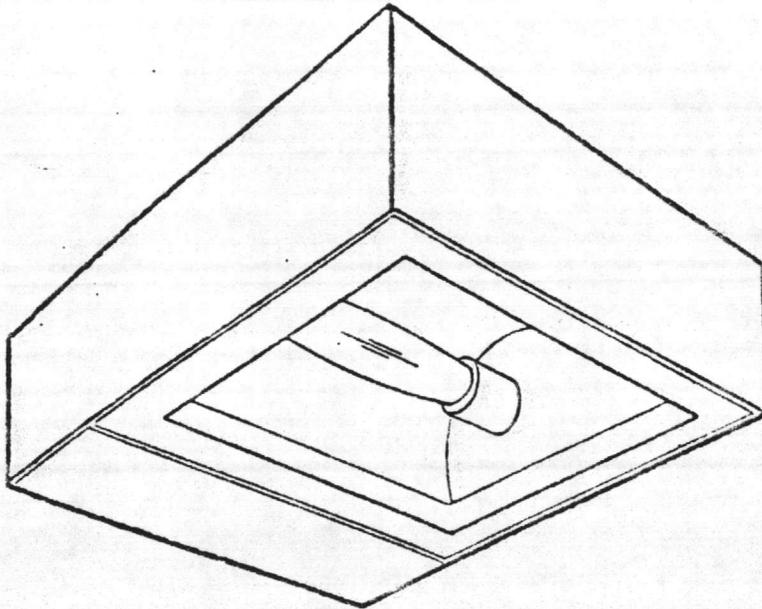
<u>SKETCH NUMBER</u>	<u>TITLE</u>
16530-24	Steel Pole, Direct Set Tenon Mount
16530-25	Steel Pole, Direct Set Mast Arm Mount
16530-26	Steel Pole, Anchor Base, Tenon Mount
16530-27	Steel Pole, Anchor Base, Mast Arm Mount
16530-28	Luminaire Mounting Brackets
16530-29	Various Luminaire Mounting Arms Types
16530-30	Miscellaneous Luminaire Mounting Brackets
16530-31	Luminaire Mounting Arms
16530-32	Luminaire Mounting Arms
16530-33	"Bolt Down" - Pole Foundation
16530-99	Sample Fixture Schedule



DO NOT INCLUDE IN PROJECT SPECIFICATION
BUT INCLUDE IN DRAWINGS.

NEGS-16530 (MARCH 1985)

SKETCH DATE: MARCH 1985



NOTE:
DISTRIBUTION SHALL BE AS
SPECIFIED AND SHALL BE
IN ACCORDANCE WITH I.E.S.
DEFINITIONS.

LUMINAIRE REQUIREMENTS

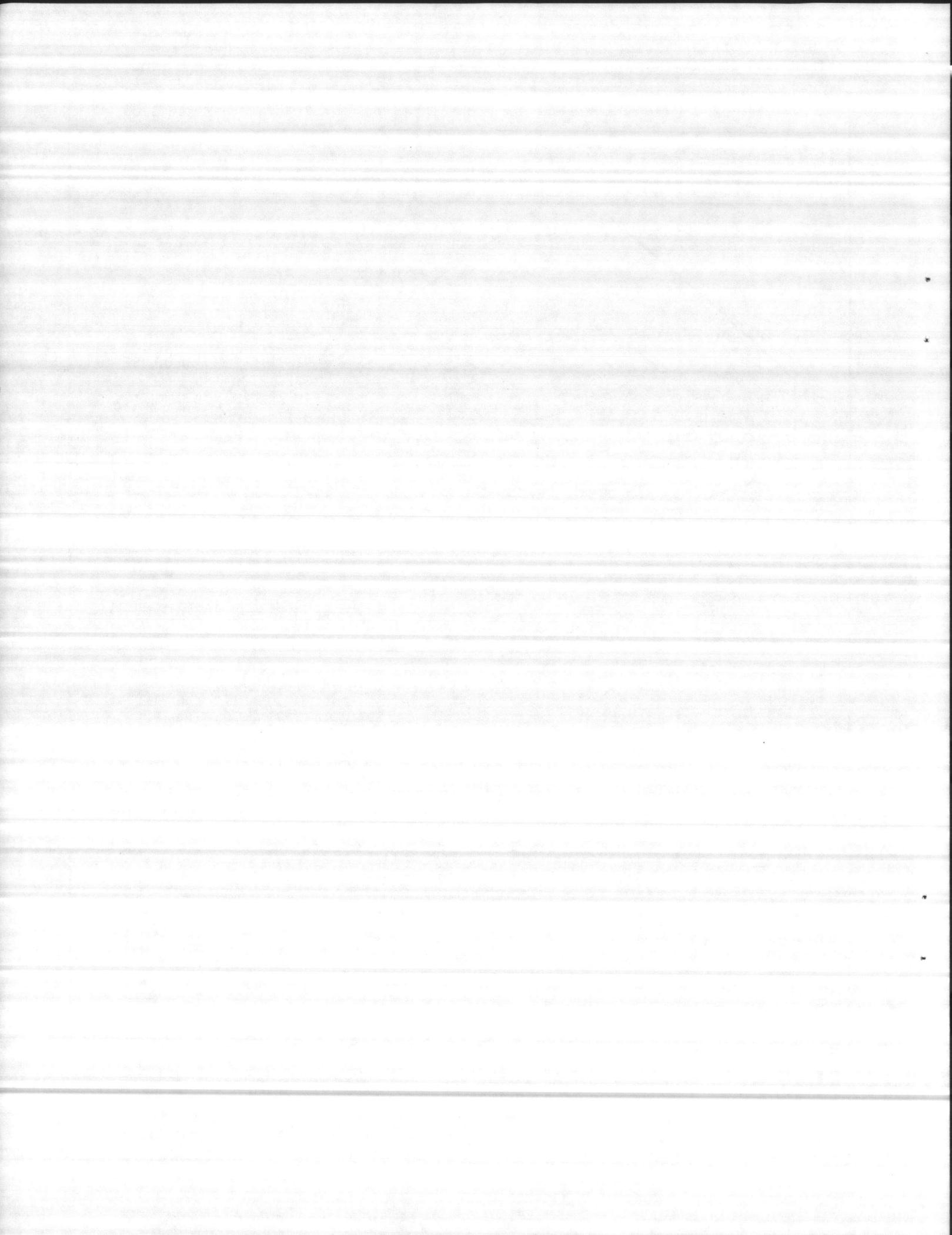
1. HOUSING, ALUMINUM - EXTRUDED OR FORMED WITH SEALED AND WELDED SEAMS.
2. REFLECTOR - FORMED ANODIZED ALUMINUM.
3. LENS - TEMPERED, IMPACT-RESISTANT CLEAR GLASS.
4. LENS DOOR - HINGED ALUMINUM WITH GASKET, CAPTIVE SCREW OR LATCHES.
5. INTEGRAL MULTI-TAP BALLAST.
6. CONCEALED MOUNTING HARDWARE (ALL HARDWARE CORROSION RESISTANT).
7. PORCELAIN SOCKET WITH VIBRATION-PROOF LAMP GRIP SHELL.
8. FINISH - DARK BRONZE, BAKED ENAMEL, EXCEPT AS INDICATED.
9. SLIPFITTER - 2-3/8" TO 3" O.D. OR MOUNTING ARM.
10. LAMP - 70-TO 1000-WATT, HIGH-PRESSURE SODIUM, WATTAGE AS SPECIFIED.
11. LAMP STABILIZER, 1000-WATT ONLY.
12. UL LISTED - SUITABLE FOR OUTDOOR WET LOCATION.
13. "HOUSE SIDE OR REAR SPILL" LIGHT SHALL BE LIMITED TO 20%, WHEN SO SPECIFIED.

MAX. E.P.A. 3.0 SQ. FT.

ROADWAY AND AREA LIGHT

SKETCH 16530-1

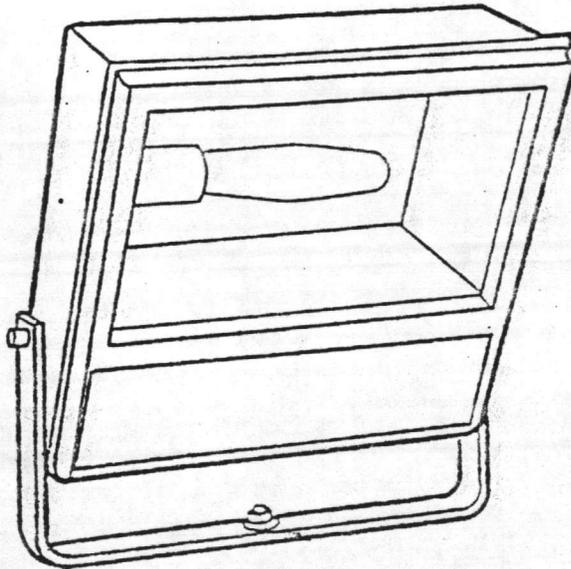




DO NOT INCLUDE IN PROJECT SPECIFICATION
BUT INCLUDE IN DRAWINGS.

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NOTE:
NEMA BEAM SPREAD
CONFIGURATION SHALL BE
AS SPECIFIED AND SHALL BE
IN ACCORDANCE WITH I.E.S.
DEFINITIONS.

LUMINAIRE REQUIREMENTS

1. HOUSING - DIE CAST ALUMINUM.
2. REFLECTOR - ANODIZED ALUMINUM.
3. DOOR - HINGED ALUMINUM, WITH GASKET AND CAPTIVE SCREWS.
4. INTEGRAL MULTI-TAP BALLAST.
5. STAINLESS STEEL OR NONCORROSIVE HARDWARE.
6. PORCELAIN SOCKET WITH VIBRATION-PROOF LAMP GRIP SHELL.
7. SLIPFITTER 2-3/8" TO 3" O.D. OR TRUNNION MOUNTING AS INDICATED.
8. PHOTOCELL WHEN SPECIFIED.
9. LAMP - 70-TO 1000-WATT - TYPE AND WATTAGE AS SPECIFIED.
10. MINIMUM 36" 3/C #14 "SO" CORD.
11. LAMP STABILIZER, 1000-W. ONLY.
12. LENS - TEMPERED, IMPACT-RESISTANT, CLEAR GLASS.
13. UL LISTED - SUITABLE FOR OUTDOOR WET LOCATIONS.

MAX. E.P.A. 2.1 SQ. FT.

FLOODLIGHT

SKETCH 16530-2

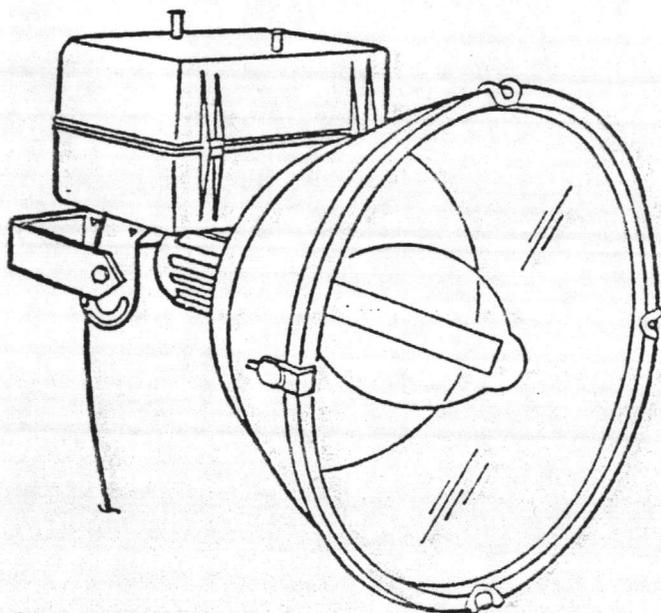
XL-2



DO NOT INCLUDE IN PROJECT SPECIFICATION
BUT INCLUDE IN DRAWINGS.

NFGS-16530 (MARCH 1985)

SKETCH DATE: MARCH 1985



LUMINAIRE REQUIREMENTS

1. CAST ALUMINUM BALLAST HOUSING.
2. ALUMINUM OUTER SHROUD.
3. SPUN ANODIZED ALUMINUM REFLECTOR.
4. TEMPERED, HEAT-RESISTANT CLEAR GLASS LENS.
5. HINGED STAINLESS STEEL DOOR WITH GASKET AND LATCHES.
6. 400-WATT AND 1000-WATT METAL HALIDE OR HIGH PRESSURE SODIUM, AS SPECIFIED.
7. INTEGRAL BALLAST, TYPE AND VOLTAGE AS SPECIFIED.
8. LAMP STABILIZER, 1000-WATT ONLY.
9. MINIMUM 36" 3/C #14 "SO" CORD.
10. ALL HARDWARE, STAINLESS STEEL OR NONCORROSIVE.
11. GALVANIZED STEEL TRUNNION.
12. PORCELAIN SOCKET, WITH VIBRATION-PROOF LAMP GRIP SHELL.
13. AIMING DEVICE.
14. UL LISTED - SUITABLE FOR OUTDOOR WET LOCATIONS.

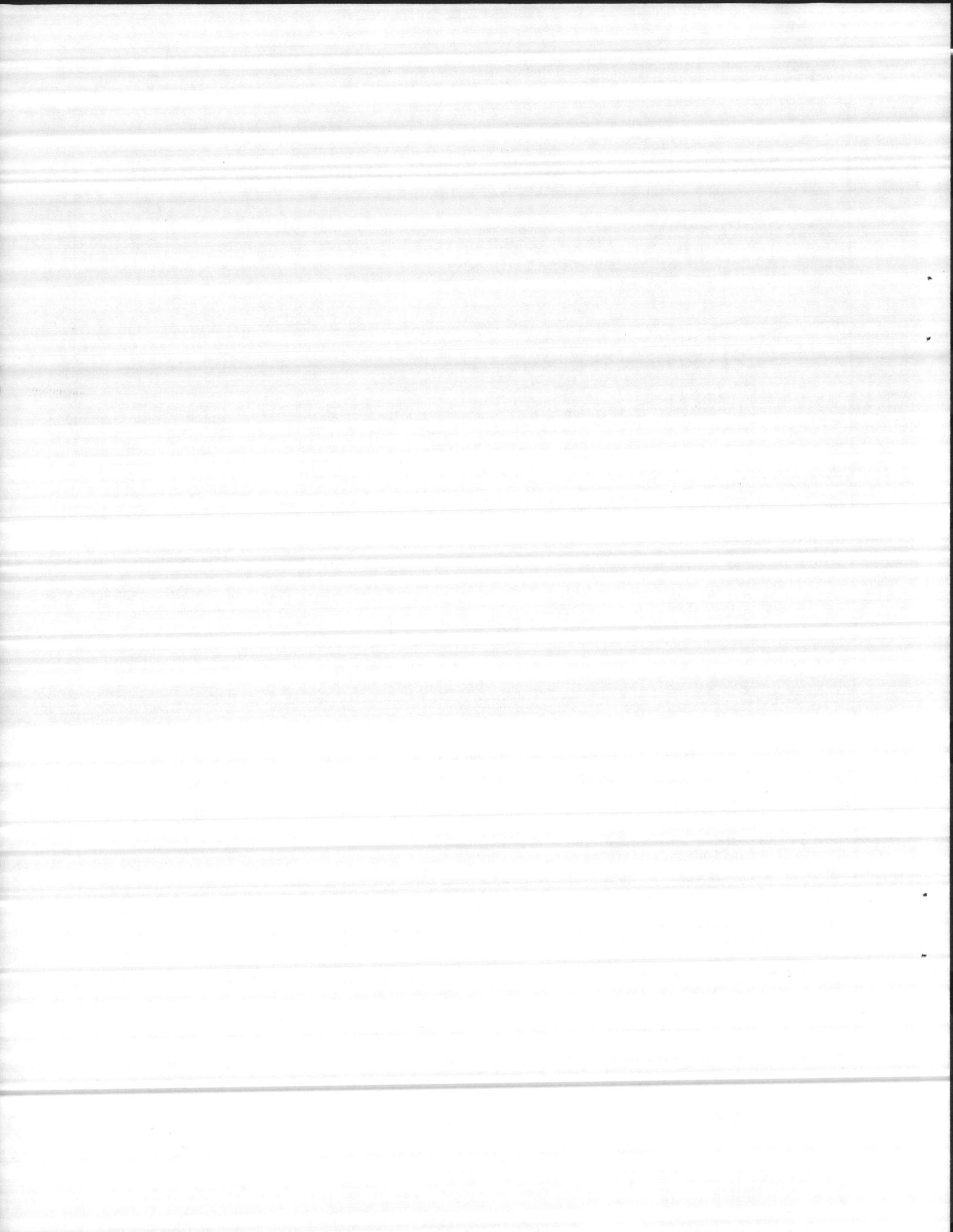
LAMP TYPE AND WATTAGE	NEMA BEAM TYPE & EFFICIENCY				
	TYPE 1 NEMA 2	TYPE 2 NEMA 3	TYPE 3 NEMA 4	TYPE 4 NEMA 5	TYPE 5 NEMA 6
400-WATT HIGH PRESSURE SODIUM	30%	34%	50%	67%	70%
1000-WATT HIGH PRESSURE SODIUM			40%	50%	55%
400-WATT METAL HALIDE	35%	40%	60%	65%	65%
1000-WATT METAL HALIDE	34%	40%	60%	60%	65%

FLOODLIGHT AND SPORTS LIGHT

MAX. E.P.A. 2.8. SQ. FT.

SKETCH 16530-3

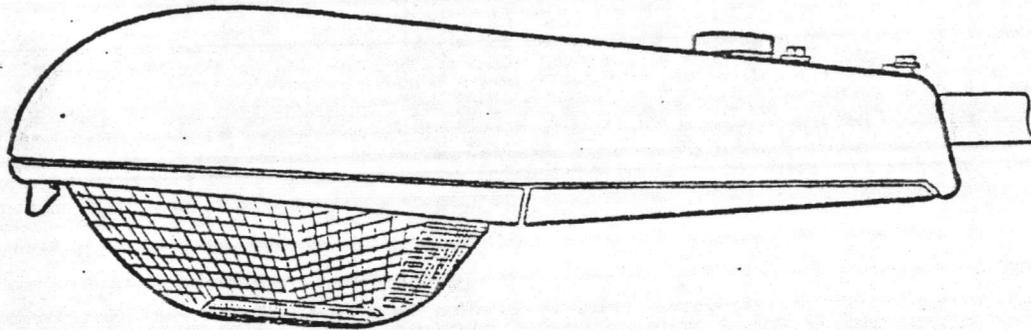
XL - 3



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BUT INCLUDE IN DRAWINGS.

NFCS-16530 (MARCH 1985)

SKETCH DATE: MARCH 1985



LUMINAIRE REQUIREMENTS

1. REFRACTOR - PRISMATIC GLASS, EXCEPT AS INDICATED.
2. REFLECTOR - ANODIZED ALUMINUM.
3. HOUSING - DIE CAST ALUMINUM.
4. HINGED ALUMINUM DOOR WITH GASKET AND LATCH.
5. INTEGRAL BALLAST - TYPE AND VOLTAGE AS SPECIFIED.
6. ALL HARDWARE, STAINLESS STEEL, OR NONCORROSIVE.
7. ADJUSTABLE PORCELAIN SOCKET.
8. 1-1/4" TO 2", SLIPFITTER - 2 OR 4 BOLT.
9. PHOTOCCELL, WHEN INDICATED.
10. LAMP - 70-WATT TO 400-WATT HIGH PRESSURE SODIUM - WATTAGE AS SPECIFIED.
11. LEVEL INDICATOR.
12. UL LISTED - SUITABLE FOR OUTDOOR WET LOCATIONS.

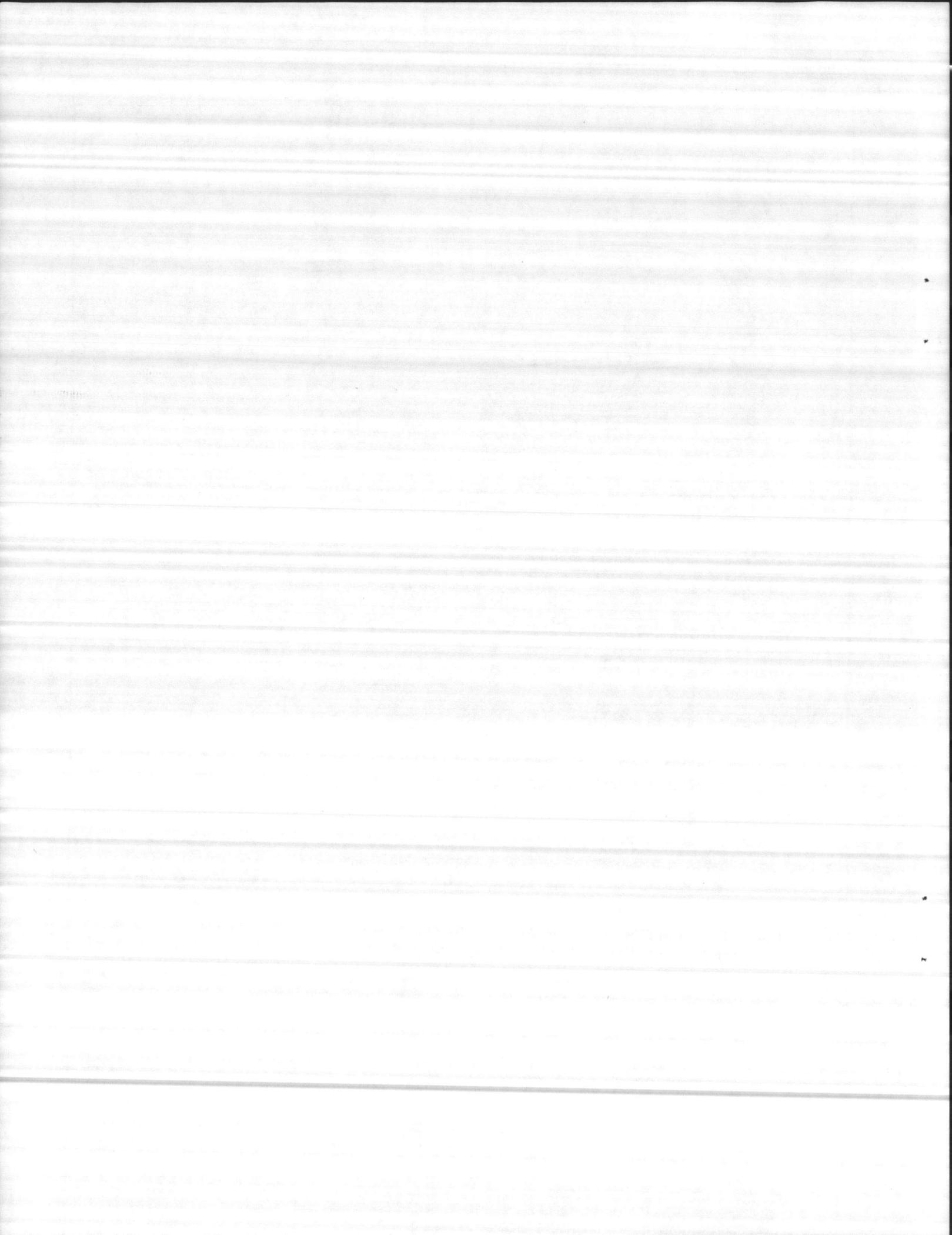
NOTE: I.E.S. TYPE DISTRIBUTION AS SPECIFIED ON PLANS.

ROADWAY AND AREA LIGHT

MAX. E.P.A. 1.3 SQ. FT.

SKETCH 16530 - 4

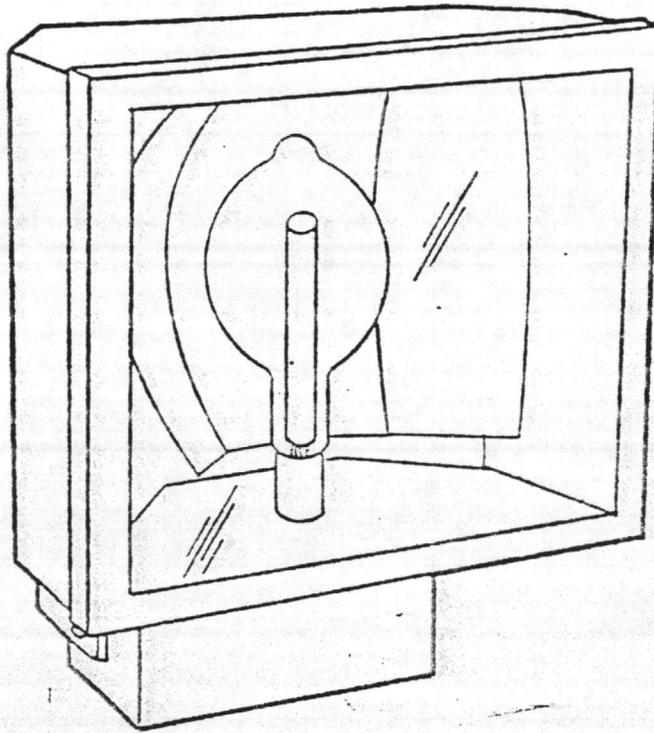
XL - 4



DO NOT INCLUDE IN PROJECT SPECIFICATION
BUT INCLUDE IN DRAWINGS.

NFGS-16530 (MARCH 1985)

SKETCH DATE: MARCH 1985



LUMINAIRE REQUIREMENTS

1. HOUSING - ANODIZED ALUMINUM.
2. REFLECTOR - POLISHED, SEGMENTED ANODIZED ALUMINUM.
3. LENS - TEMPERED, THERMAL AND SHOCK-RESISTANT GLASS.
4. DOOR FASTENERS - STAINLESS STEEL.
5. INTEGRAL BALLAST - 1000-WATT METAL HALIDE OR 1000-WATT H.P.S. AS SPECIFIED.
6. HINGED, GASKETED DOOR.
7. PORCELAIN SOCKET, WITH VIBRATION-PROOF LAMP GRIP SHELL.
8. 3/C #14 "SO" CORD.
9. GALVANIZED YOKE.
10. UL LISTED - SUITABLE FOR OUTDOOR WET LOCATIONS.

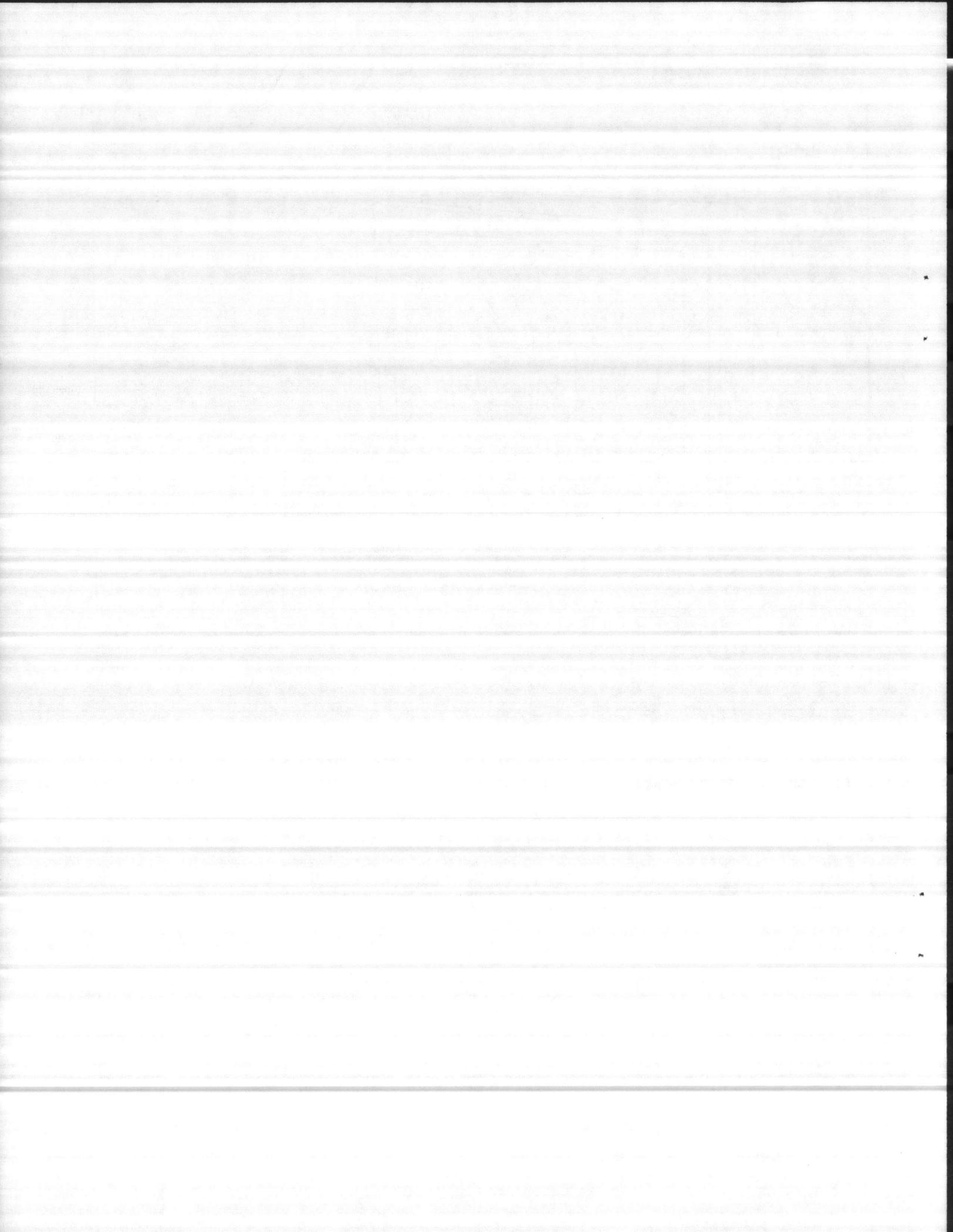
NOTE: LAMP, BALLAST, AND BEAM PATTERN SHALL BE AS SPECIFIED AND AS SHOWN ON PLANS.

MAX. E.P.A. 5.5 SQ. FT.

SPORTS AND AREA LIGHT

SKETCH 16530-5

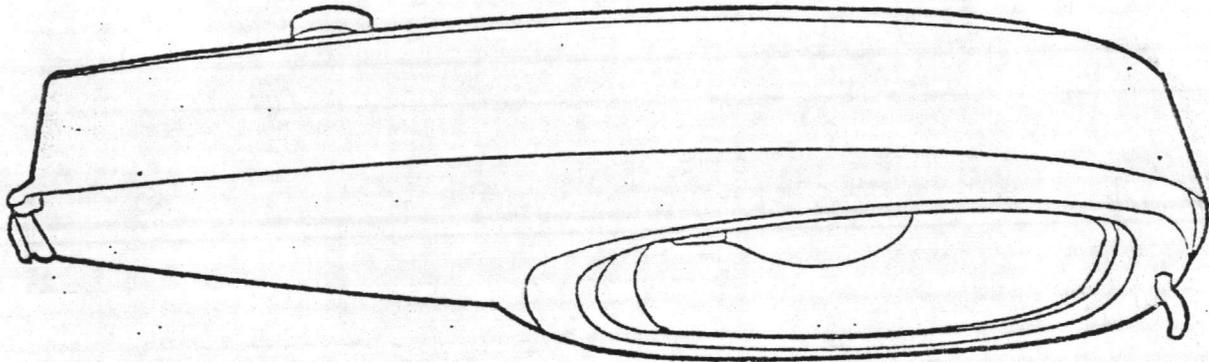
XL - 5



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BUT INCLUDE IN DRAWINGS.

NFGS-16530 (MARCH 1985)

SKETCH DATE: MARCH 1985



NOTE: I.E.S. TYPE DISTRIBUTION AS SPECIFIED ON PLANS.

LUMINAIRE REQUIREMENTS

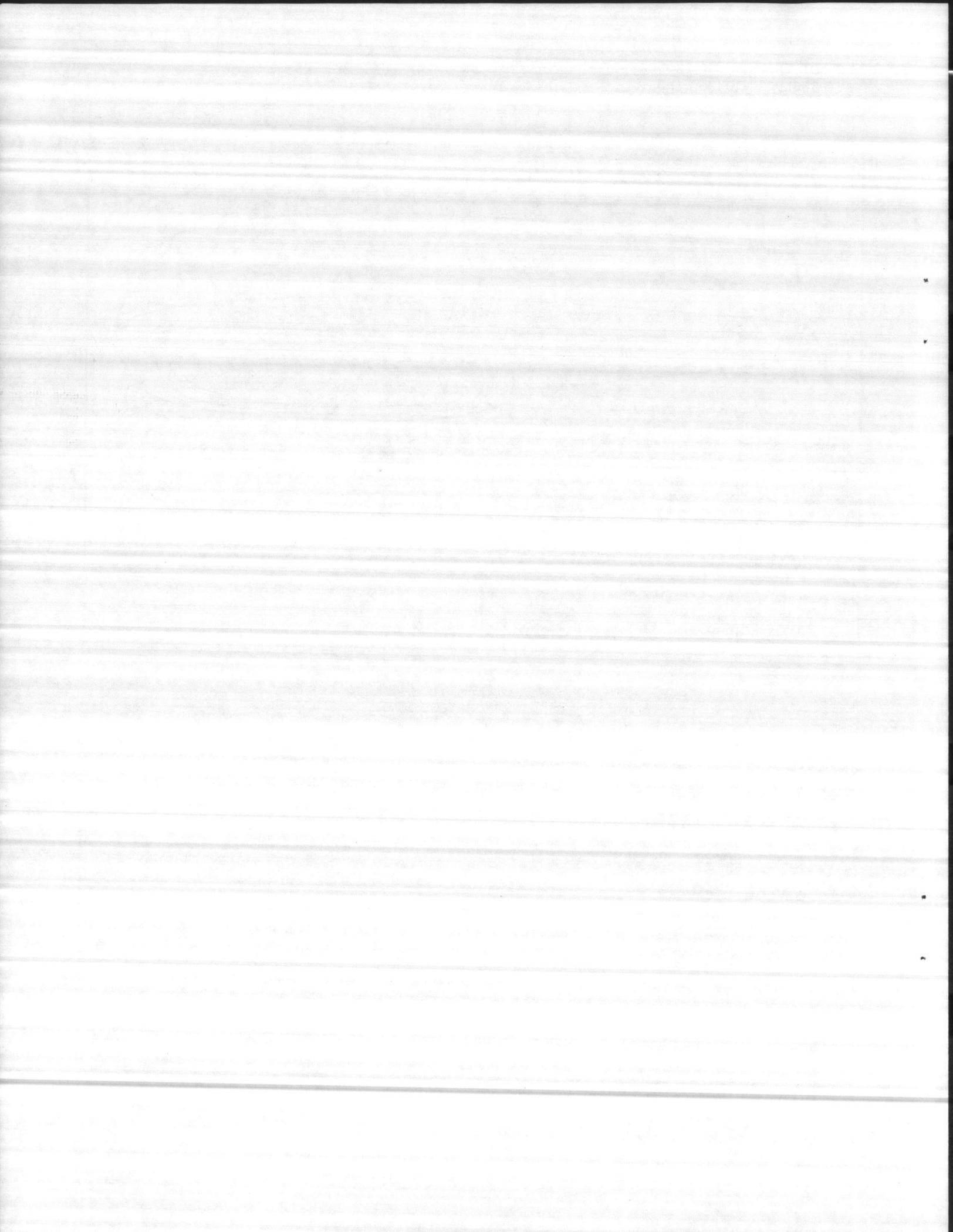
1. HOUSING - CAST ALUMINUM.
2. LENS - FLAT TEMPERED GLASS.
3. REFLECTOR - ANODIZED ALUMINUM.
4. HINGED ALUMINUM DOOR WITH GASKET AND SPRING LATCH.
5. INTEGRAL BALLAST - TYPE AND VOLTAGE AS SPECIFIED.
6. ALL HARDWARE - STAINLESS STEEL OR NONCORROSIVE.
7. ADJUSTABLE PORCELAIN SOCKET.
8. 1-1/4" TO 2" SLIPFITTER - 2 OR 4 BOLT TYPE.
9. PHOTOCCELL, WHEN INDICATED.
10. LAMP - 70-TO 400-WATT HIGH PRESSURE SODIUM - WATTAGE AS SPECIFIED.
11. LEVEL INDICATOR.
12. U.L. LISTED - SUITABLE FOR OUTDOOR WET LOCATIONS.

MAX. E.P.A. 1.3 SQ. FT.

AREA AND STREET LIGHTING CUTOFF LUMINAIRE

SKETCH 16530-6

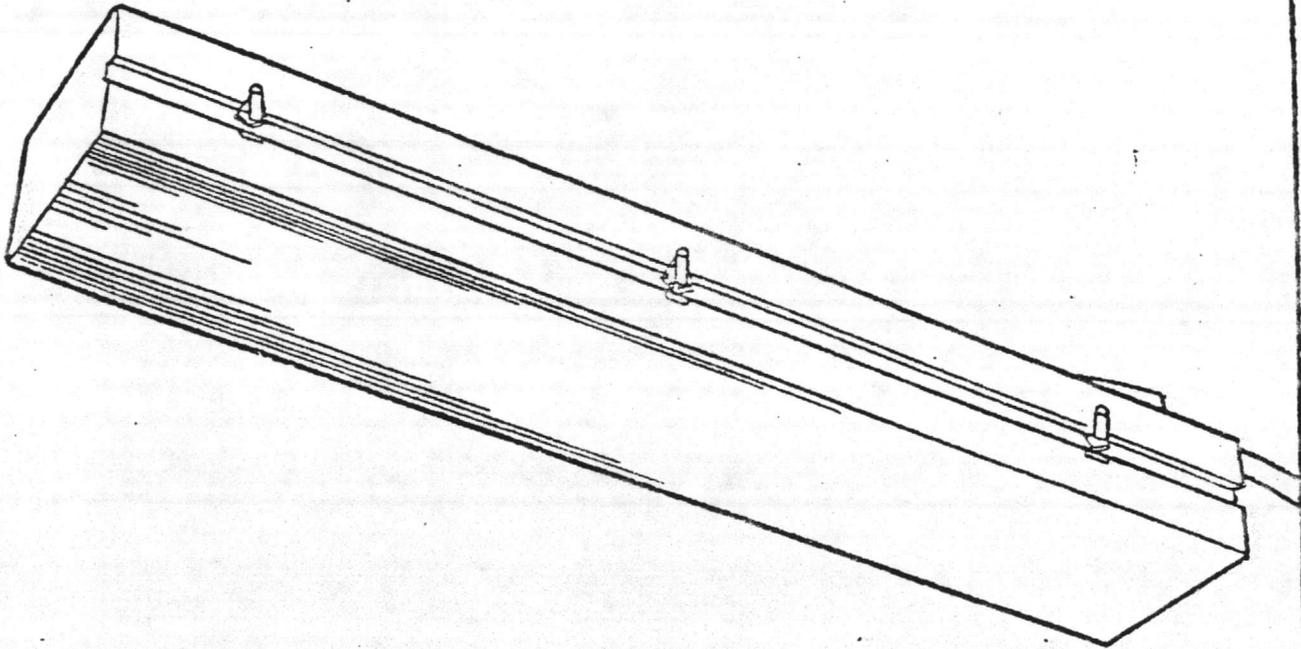
XL - 6



DO NOT INCLUDE IN PROJECT SPECIFICATION
BUT INCLUDE IN DRAWINGS.

NFGS-16530 (MARCH 1985)

SKETCH DATE: MARCH 1985



LUMINAIRE REQUIREMENTS

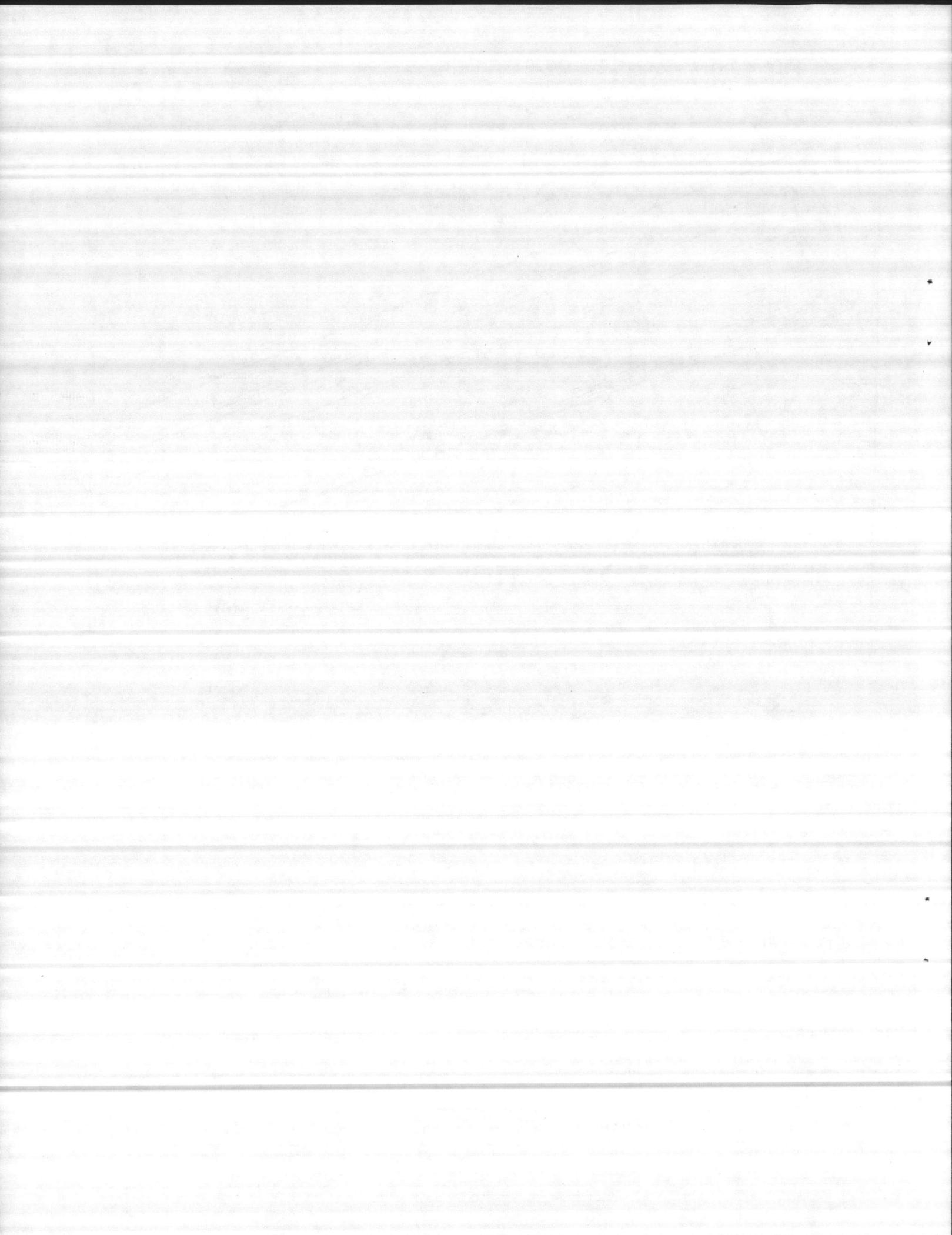
1. HOUSING, ALUMINUM - EXTRUDED OR FORMER WITH SEALED AND WELDED SEAMS.
2. REFRACTOR HINGED. - ONE PIECE ULTRA VIOLET RESISTANT ACRYLIC - MINIMUM .125" THICK.
3. REFLECTOR - ANODIZED ALUMINUM.
4. LATCHES STAINLESS STEEL, QUICK RELEASE TYPE.
5. GASKETING - CONTINUOUS, HEAT RESISTANT.
6. BALLAST - HIGH POWER FACTOR.
7. FINISH - BAKED ACRYLIC ENAMEL, MUNSELL GREY, EXCEPT AS INDICATED.
8. HARDWARE - CORROSION RESISTANT.
9. LAMP - 35; 55; 90; 135; OR 180-WATT AS SPECIFIED.
10. SLIPFITTER - FOR 1-1/4" TO 2" ARM.
11. PHOTO CELL - WHEN INDICATED.
12. UL LISTED - SUITABLE FOR OUTDOOR WET LOCATIONS.
13. LAMP STABILIZER.

MAX. E.P.A. 2.4 SQ. FT.

LOW PRESSURE SODIUM AREA LIGHTING LUMINAIRE

SKETCH 16530-7

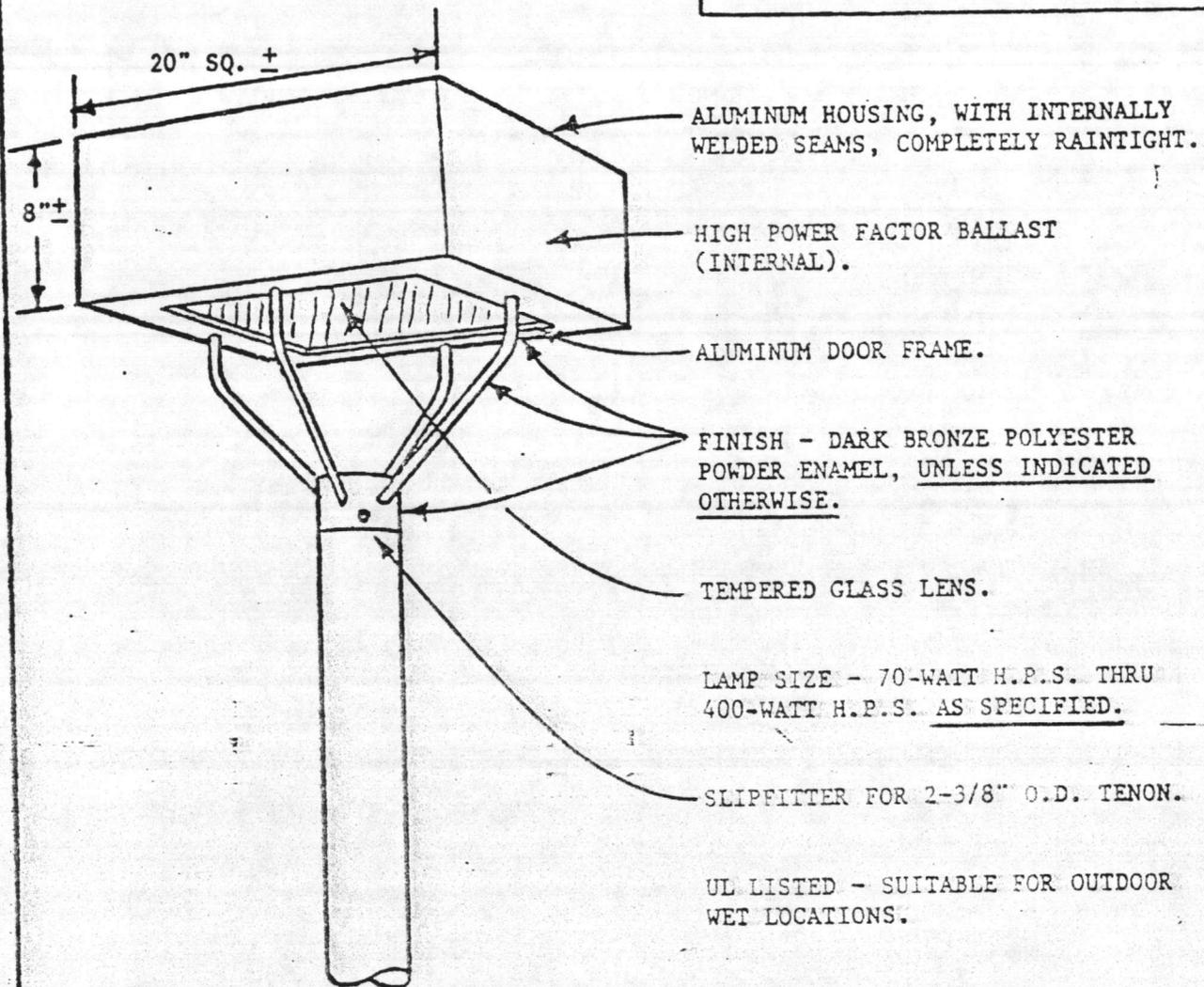
XL-7



DO NOT INCLUDE IN PROJECT SPECIFICATION
BUT INCLUDE IN DRAWINGS.

NFGS-16530 (MARCH 1985)

SKETCH DATE: MARCH 1985

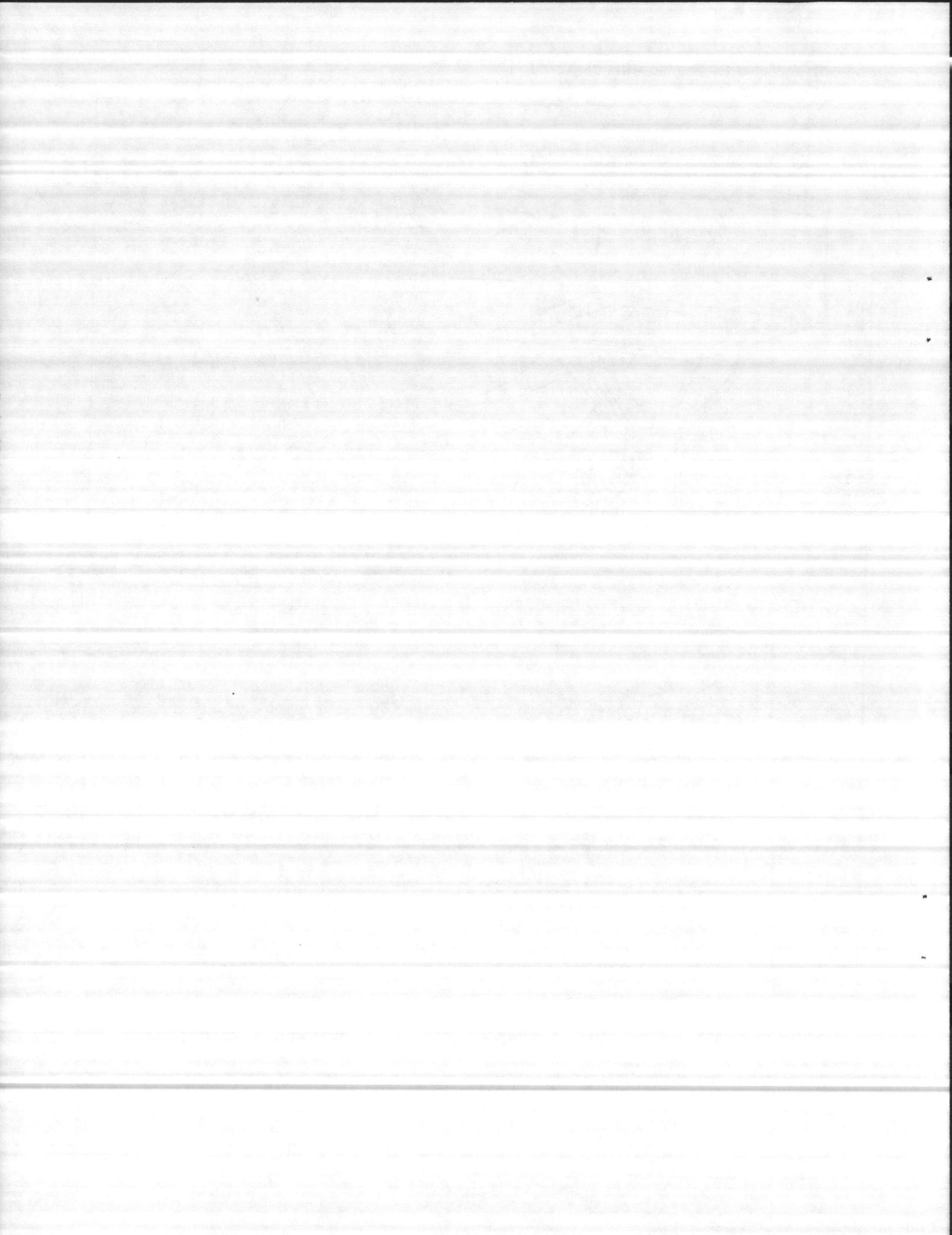


MAX. E.P.A. 2.2 SQ. FT.

AREA LUMINAIRE

SKETCH 16530-8

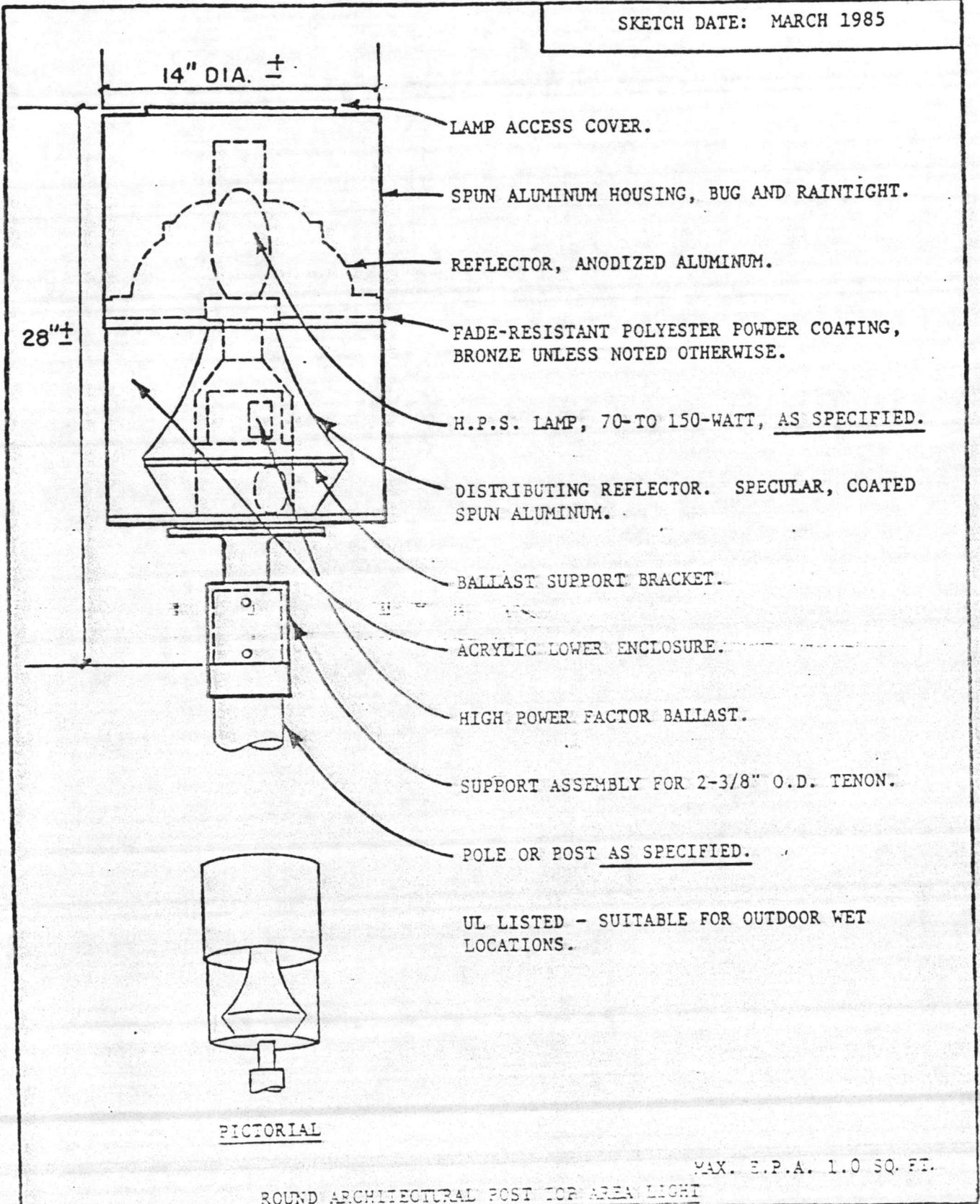
XL-8



DO NOT INCLUDE IN PROJECT SPECIFICATION
BUT INCLUDE IN DRAWINGS.

NFGS-16530 (MARCH 1985)

SKETCH DATE: MARCH 1985



14" DIA. ±

28" ±

- LAMP ACCESS COVER.
- SPUN ALUMINUM HOUSING, BUG AND RAIN TIGHT.
- REFLECTOR, ANODIZED ALUMINUM.
- FADE-RESISTANT POLYESTER POWDER COATING, BRONZE UNLESS NOTED OTHERWISE.
- H.P.S. LAMP, 70-TO 150-WATT, AS SPECIFIED.
- DISTRIBUTING REFLECTOR. SPECULAR, COATED SPUN ALUMINUM.
- BALLAST SUPPORT BRACKET.
- ACRYLIC LOWER ENCLOSURE.
- HIGH POWER FACTOR BALLAST.
- SUPPORT ASSEMBLY FOR 2-3/8" O.D. TENON.
- POLE OR POST AS SPECIFIED.

UL LISTED - SUITABLE FOR OUTDOOR WET LOCATIONS.

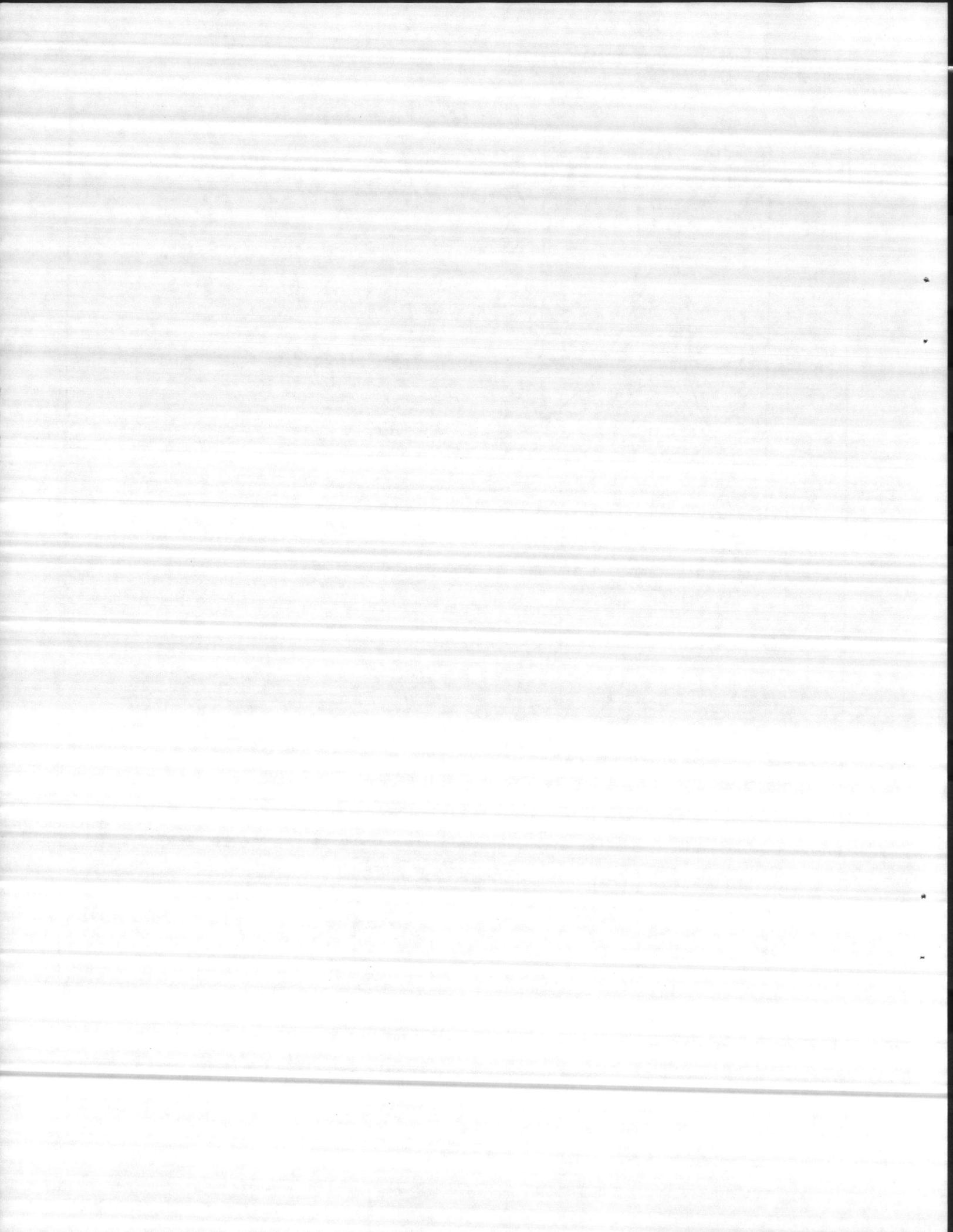
MAX. E.P.A. 1.0 SQ. FT.

ROUND ARCHITECTURAL POST TOP AREA LIGHT

PICTORIAL

SKETCH 16530-9

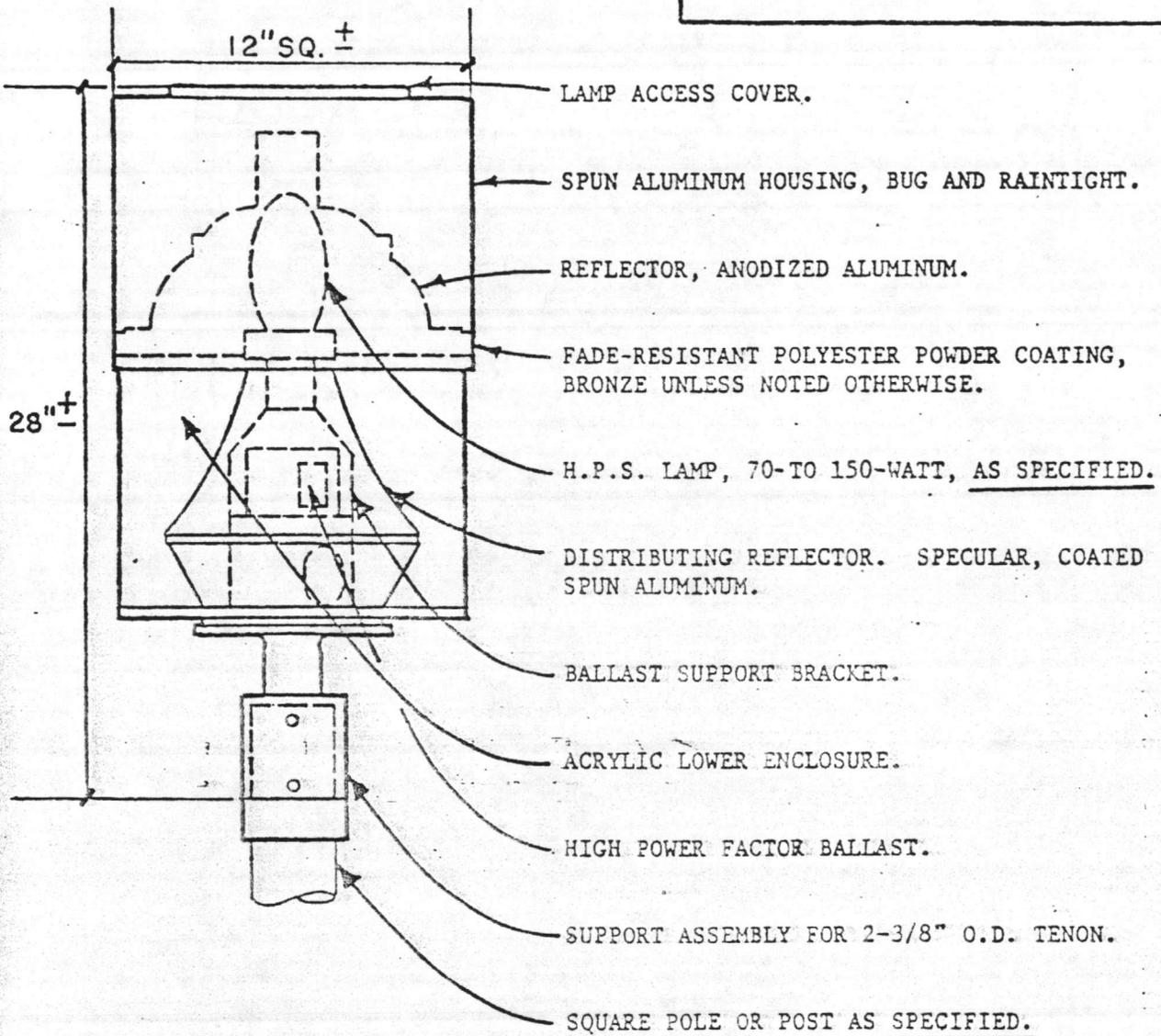
XL-9



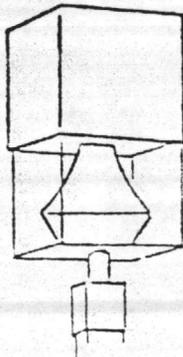
DO NOT INCLUDE IN PROJECT SPECIFICATION
BUT INCLUDE IN DRAWINGS.

NFGS-16530 (MARCH 1985)

SKETCH DATE: MARCH 1985



UL LISTED - SUITABLE FOR OUTDOOR WET LOCATIONS.



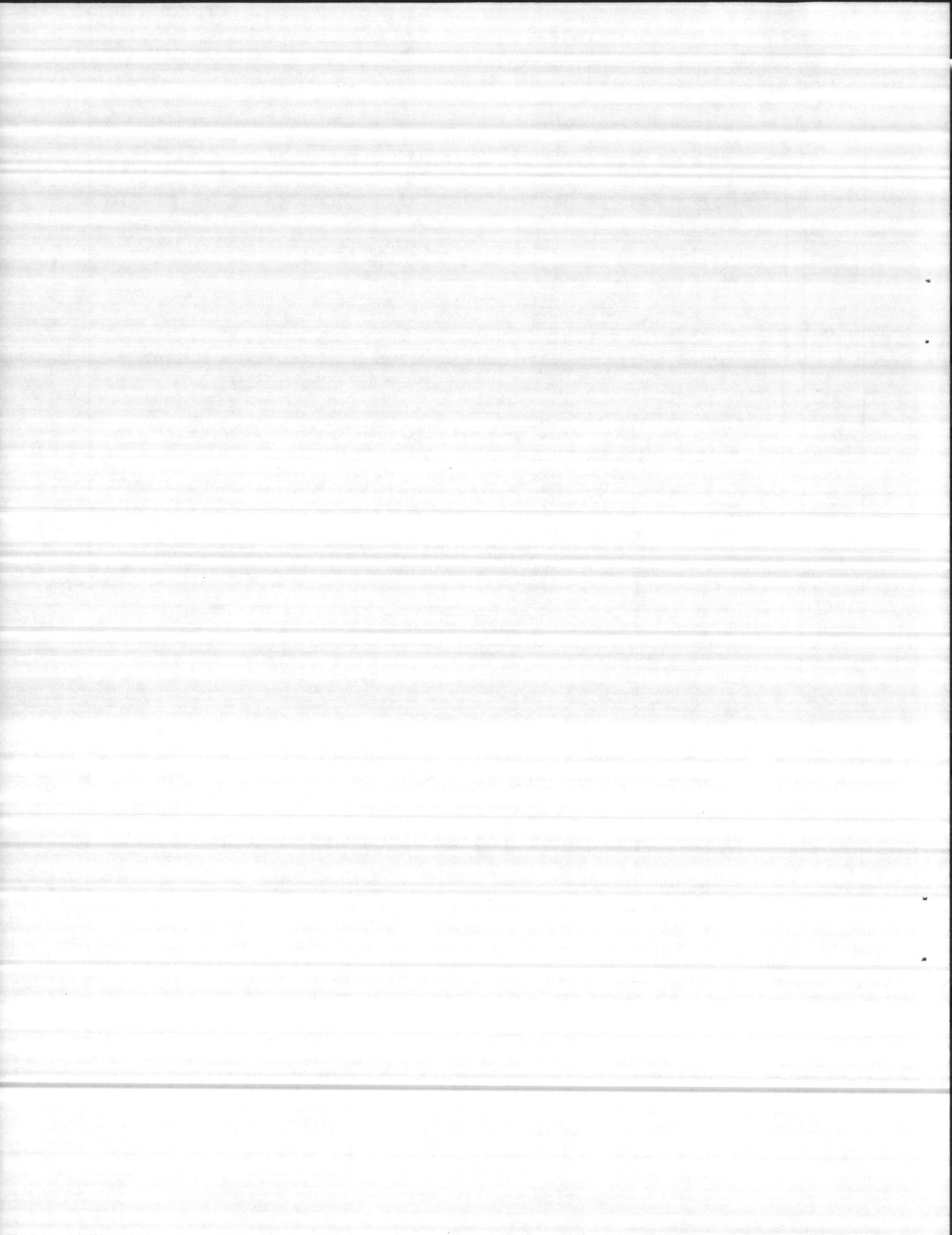
PICTORIAL

SQUARE ARCHITECTURAL POST TOP AREA LIGHT

MAX. E.P.A. 2.1 SQ. FT.

SKETCH 16530-10

XL-10



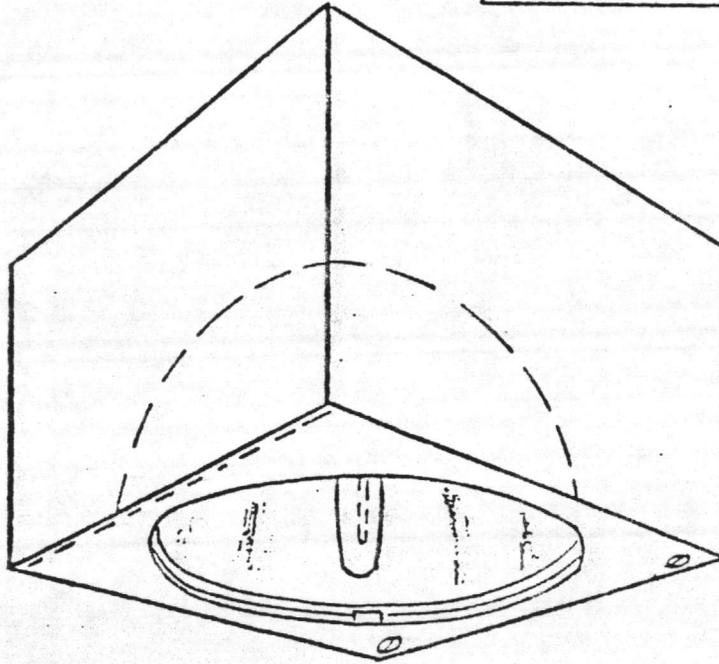
DO NOT INCLUDE IN PROJECT SPECIFICATION
BUT INCLUDE IN DRAWINGS.

NFGS-16530 (MARCH 1985)

SKETCH DATE: MARCH 1985

NOTE:

- TYPE A -
- SQUARE.
- TYPE B -
- ROUND.



LUMINAIRE REQUIREMENTS

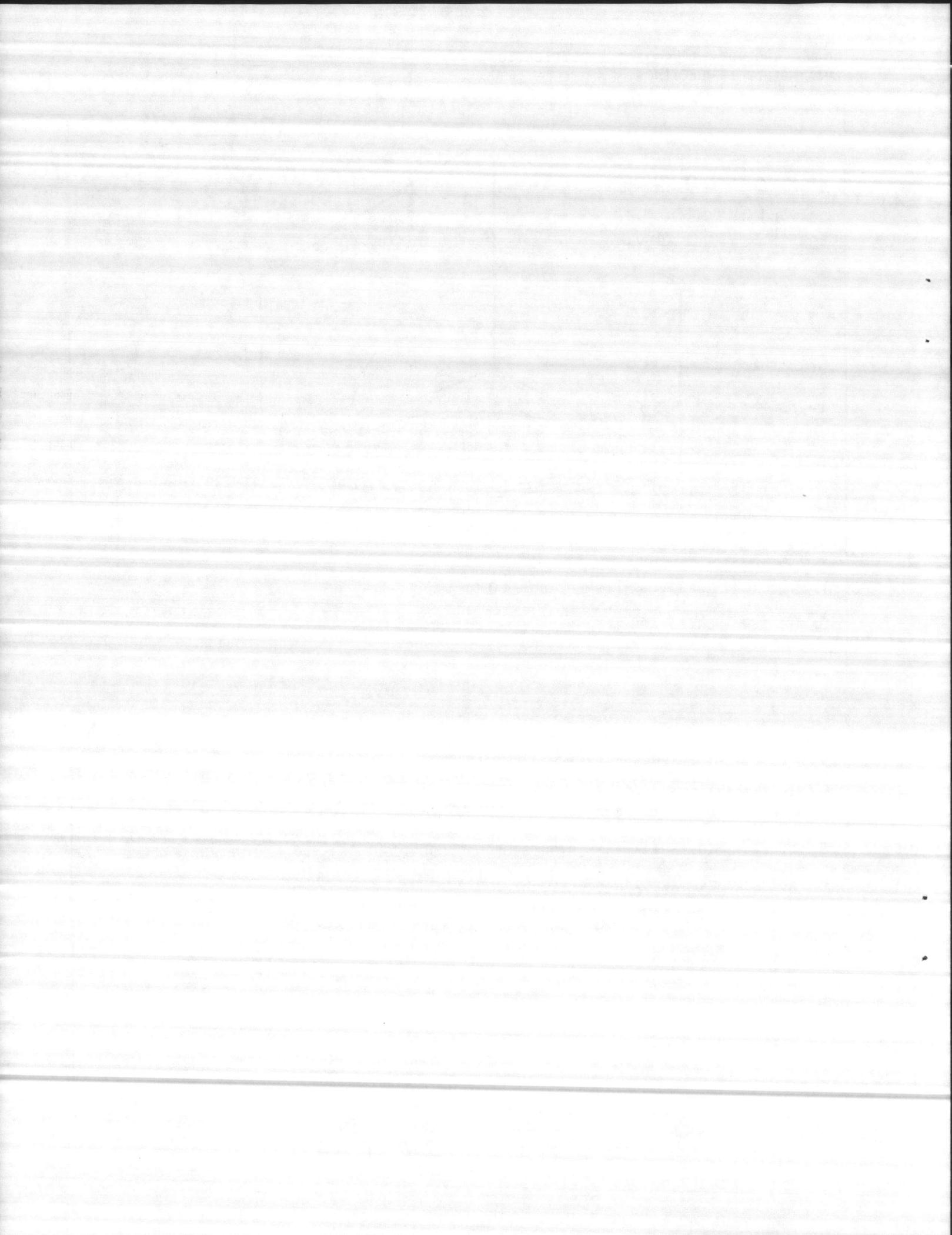
1. HOUSING - CAST, OR FORMED AND SEALED ALUMINUM.
2. FINISH - BAKED ACRYLIC OR VINYL CLAD WITH SEALER.
COLOR - DARK BRONZE OR AS SPECIFIED.
3. REFLECTOR - ALZAK ALUMINUM.
4. LENS - FLAT, HEAT AND SHOCK-RESISTANT GLASS.
5. HINGED AND GASKETED ALUMINUM DOOR FRAME.
6. INTEGRAL BALLAST WITH 70- TO 1000-WATT H.P.S. OR 250-WATT TO 1000-WATT METAL HALIDE, AS SPECIFIED.
7. U.L. LISTED, SUITABLE FOR OUTDOOR WET LOCATIONS.
8. ADJUSTABLE PORCELAIN SOCKET.
9. STAINLESS STEEL 1/4 TURN OR QUICK RELEASE LATCHES.
10. SLIPFITTER FOR 2" O.D. PIPE, OR EXTRUDED MAST ARM, AS SPECIFIED.

MAX. E.P.A. - 6.1 SQ. FT.

AREA LIGHT - (VERTICAL LAMP)

SKETCH 16530-II

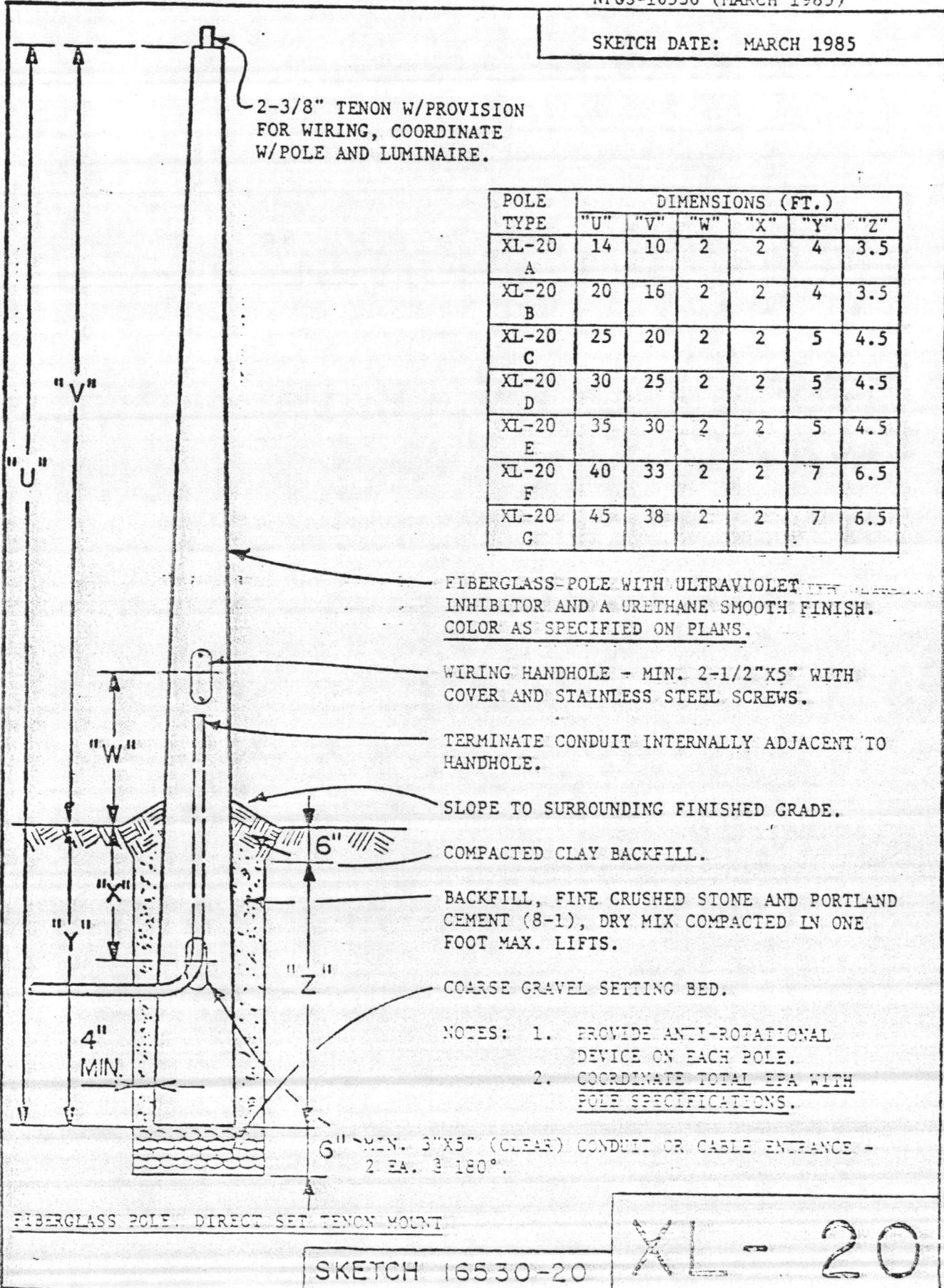
XL-II



DO NOT INCLUDE IN PROJECT SPECIFICATION
BUT INCLUDE IN DRAWINGS.

NFGS-16530 (MARCH 1985)

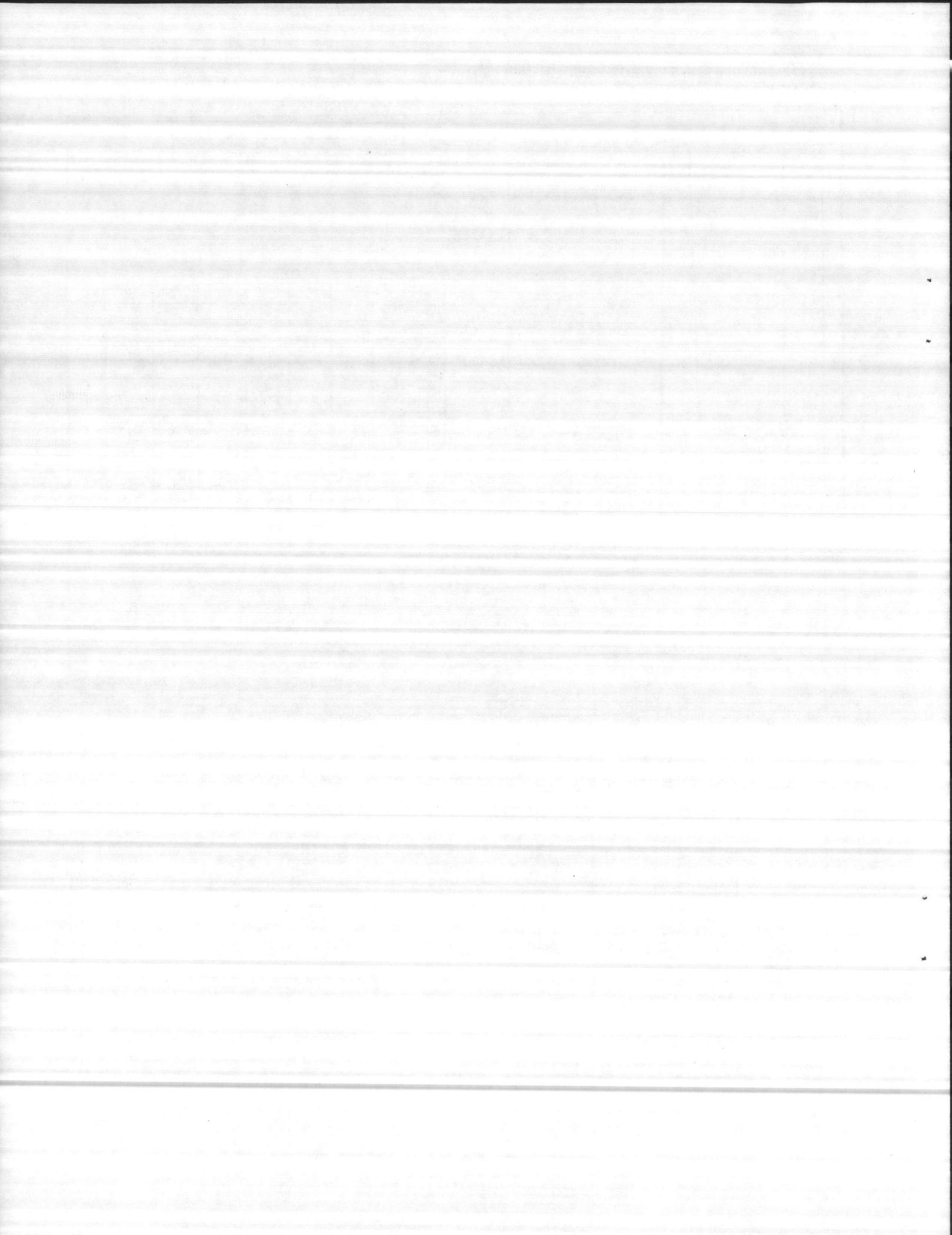
SKETCH DATE: MARCH 1985



POLE TYPE	DIMENSIONS (FT.)					
	"U"	"V"	"W"	"X"	"Y"	"Z"
XL-20 A	14	10	2	2	4	3.5
XL-20 B	20	16	2	2	4	3.5
XL-20 C	25	20	2	2	5	4.5
XL-20 D	30	25	2	2	5	4.5
XL-20 E	35	30	2	2	5	4.5
XL-20 F	40	33	2	2	7	6.5
XL-20 G	45	38	2	2	7	6.5

SKETCH 16530-20

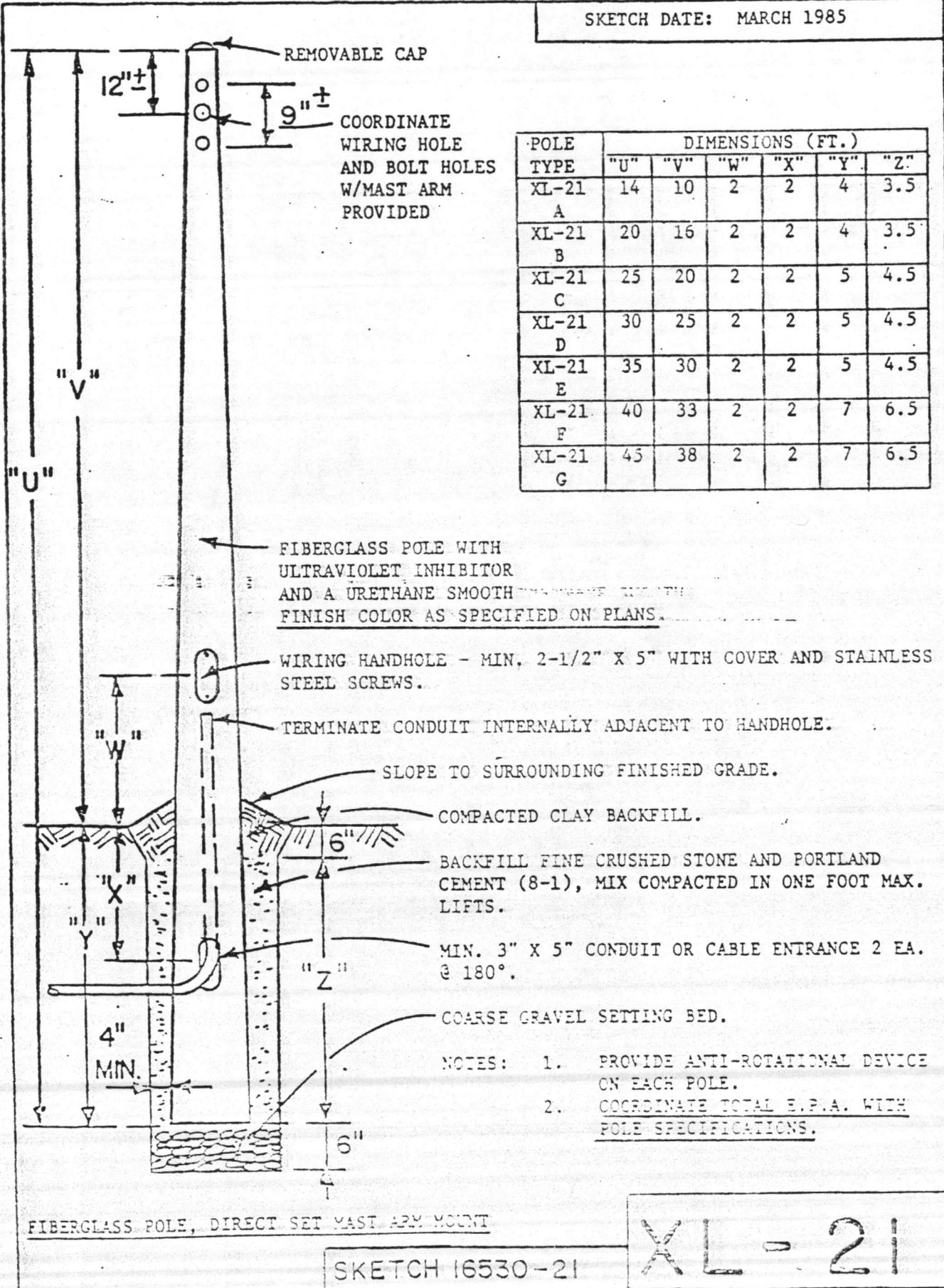
XL-20



DO NOT INCLUDE IN PROJECT SPECIFICATION.
BUT INCLUDE IN DRAWINGS.

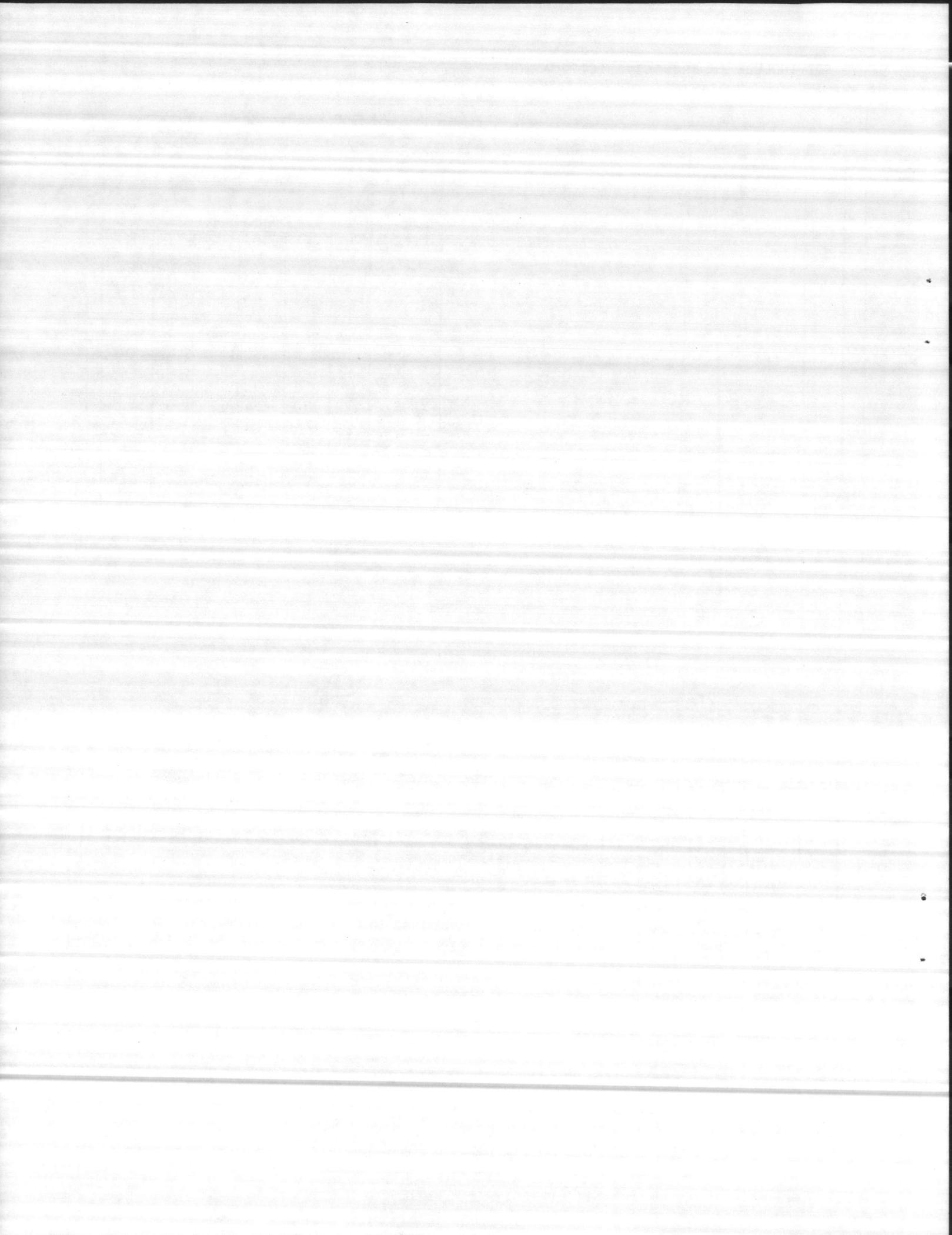
NFGS-16530 (MARCH 1985)

SKETCH DATE: MARCH 1985



SKETCH 16530-21

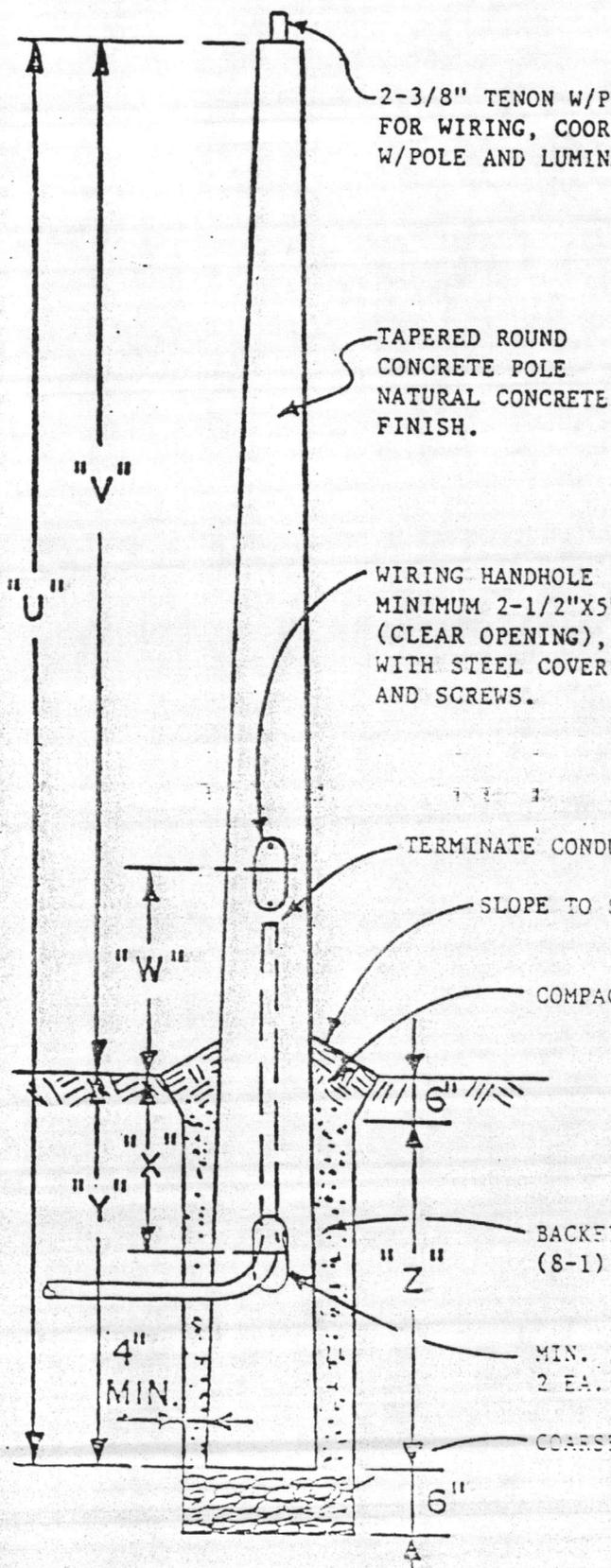
XL-21



DO NOT INCLUDE IN PROJECT SPECIFICATION
BUT INCLUDE IN DRAWINGS.

NFGS-16530 (MARCH 1985)

SKETCH DATE: MARCH 1985



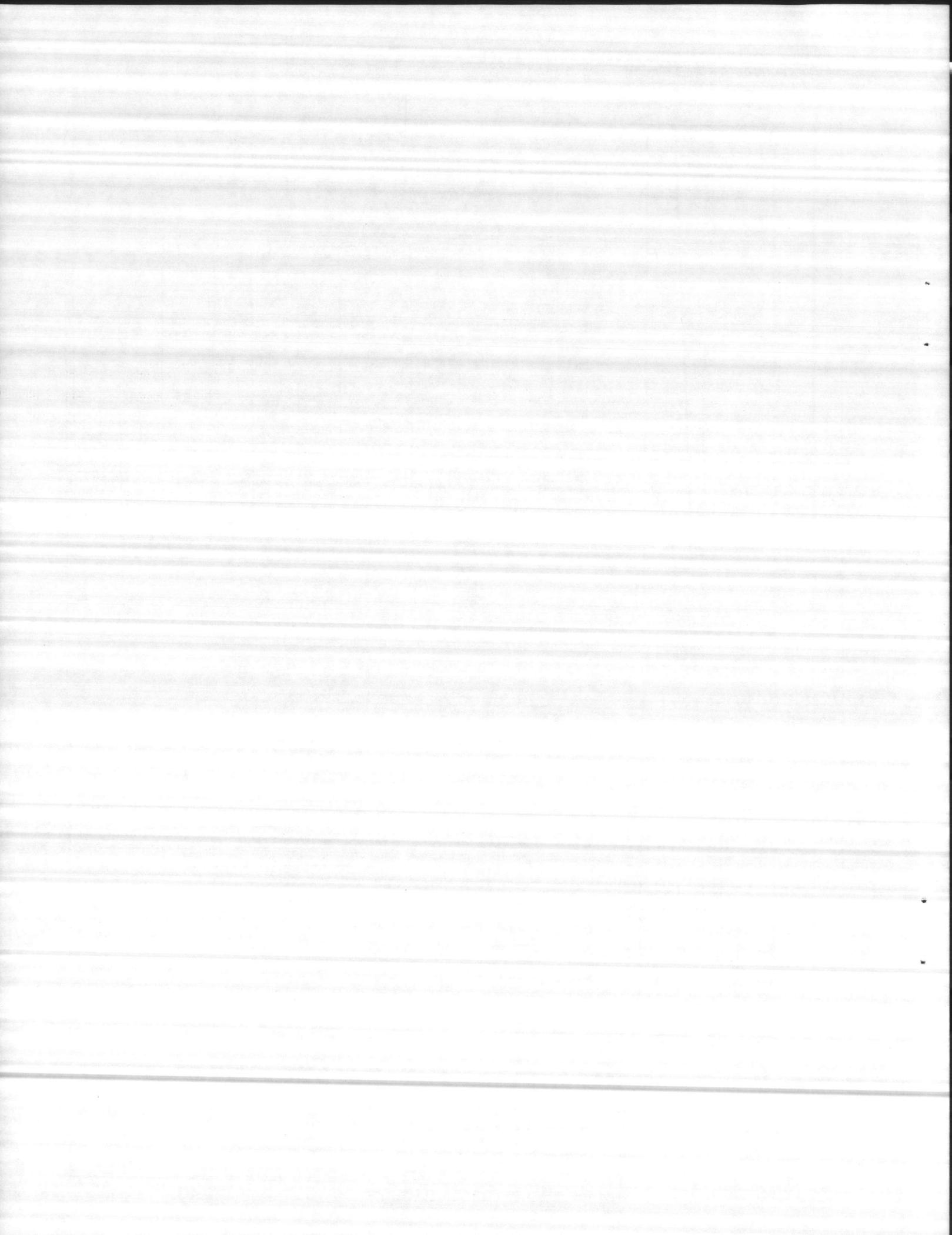
POLE TYPE	DIMENSIONS (FT.)					
	"U"	"V"	"W"	"X"	"Y"	"Z"
XL-22 A	14	10	2	2	4	3.5
XL-22 B	20	16	2	2	4	3.5
XL-22 C	25	20	2	2	5	4.5
XL-22 D	30	25	2	2	5	4.5
XL-22 E	35	30	2	2	5	4.5
XL-22 F	40	33	2	2	7	6.5
XL-22 G	45	38	2	2	7	6.5

- NOTES: 1. PROVIDE ANTI-ROTATIONAL DEVICE ON EACH POLE.
2. COORDINATE TOTAL EPA WITH POLE SPECIFICATIONS.

CONCRETE POLE, DIRECT SET TENON MOUNT

SKETCH 16530-22

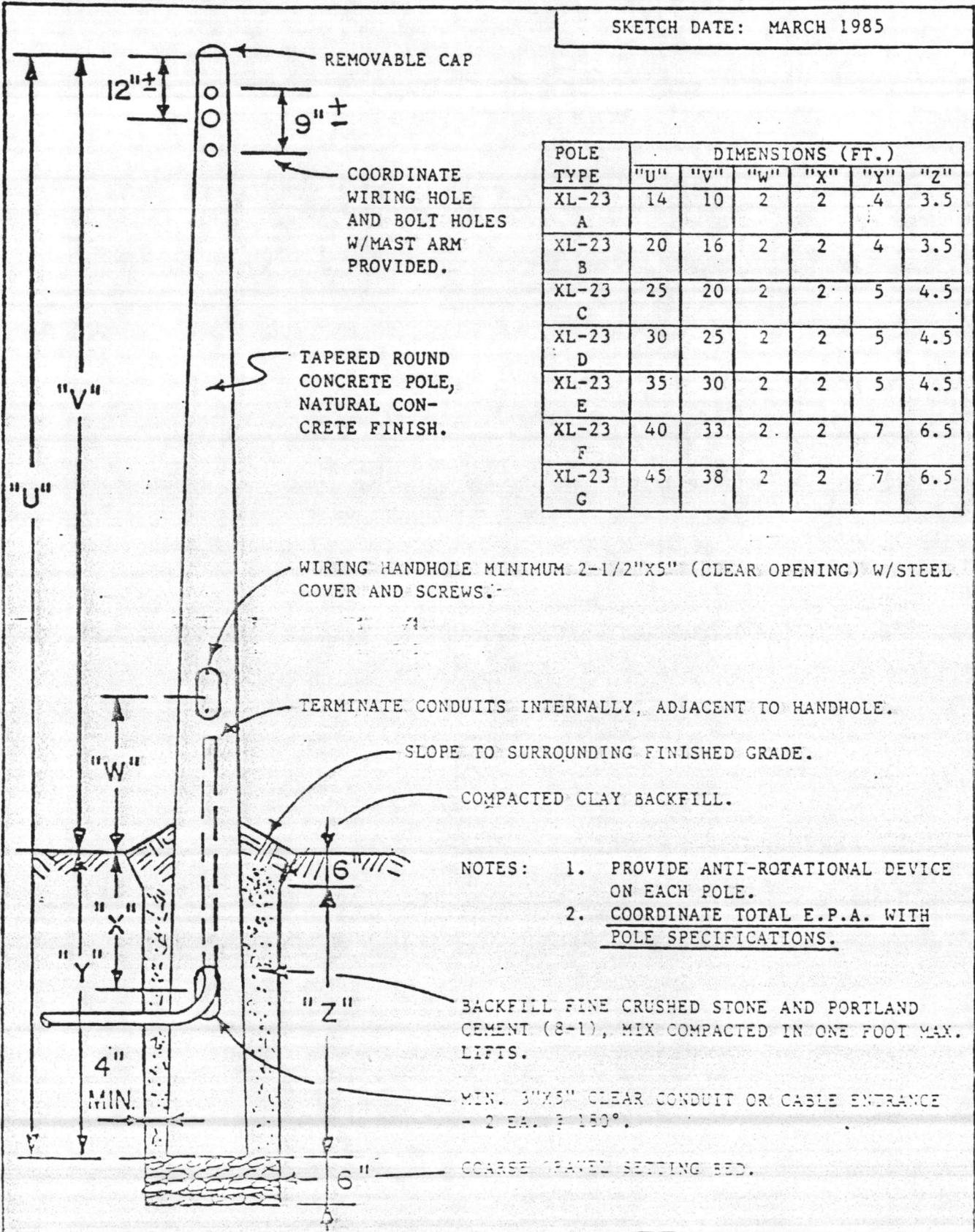
XL-22



DO NOT INCLUDE IN PROJECT SPECIFICATION
BUT INCLUDE IN DRAWINGS.

NFGS-16530 (MARCH 1985)

SKETCH DATE: MARCH 1985



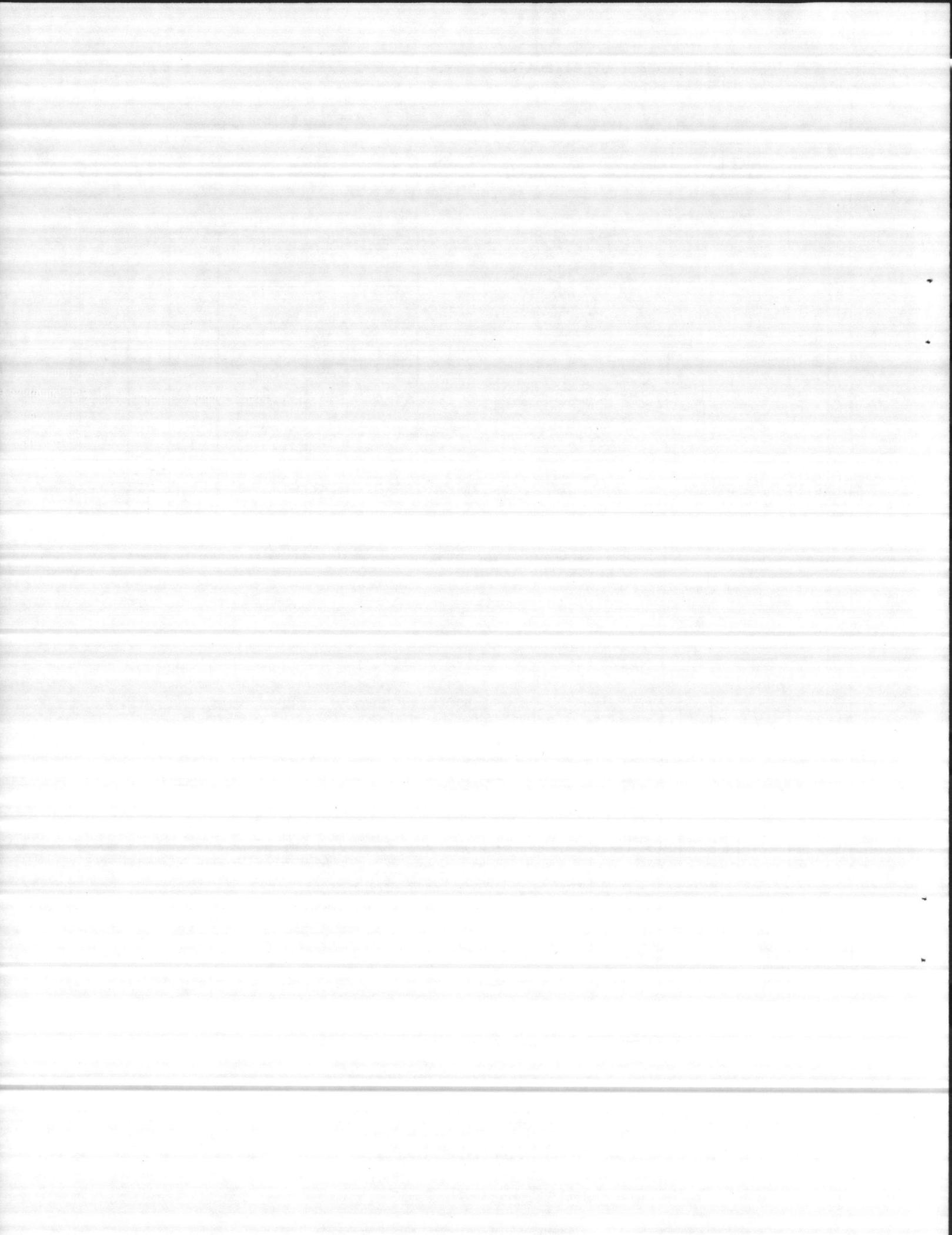
POLE TYPE	DIMENSIONS (FT.)					
	"U"	"V"	"W"	"X"	"Y"	"Z"
XL-23 A	14	10	2	2	4	3.5
XL-23 B	20	16	2	2	4	3.5
XL-23 C	25	20	2	2	5	4.5
XL-23 D	30	25	2	2	5	4.5
XL-23 E	35	30	2	2	5	4.5
XL-23 F	40	33	2	2	7	6.5
XL-23 G	45	38	2	2	7	6.5

- NOTES:
1. PROVIDE ANTI-ROTATIONAL DEVICE ON EACH POLE.
 2. COORDINATE TOTAL E.P.A. WITH POLE SPECIFICATIONS.
- BACKFILL FINE CRUSHED STONE AND PORTLAND CEMENT (8-1), MIX COMPACTED IN ONE FOOT MAX. LIFTS.
- MIN. 3"X5" CLEAR CONDUIT OR CABLE ENTRANCE - 2 EA. @ 150°.
- COARSE GRAVEL SETTING BED.

CONCRETE POLE, DIRECT SET MAST ARM MOUNT.

SKETCH 16530-23

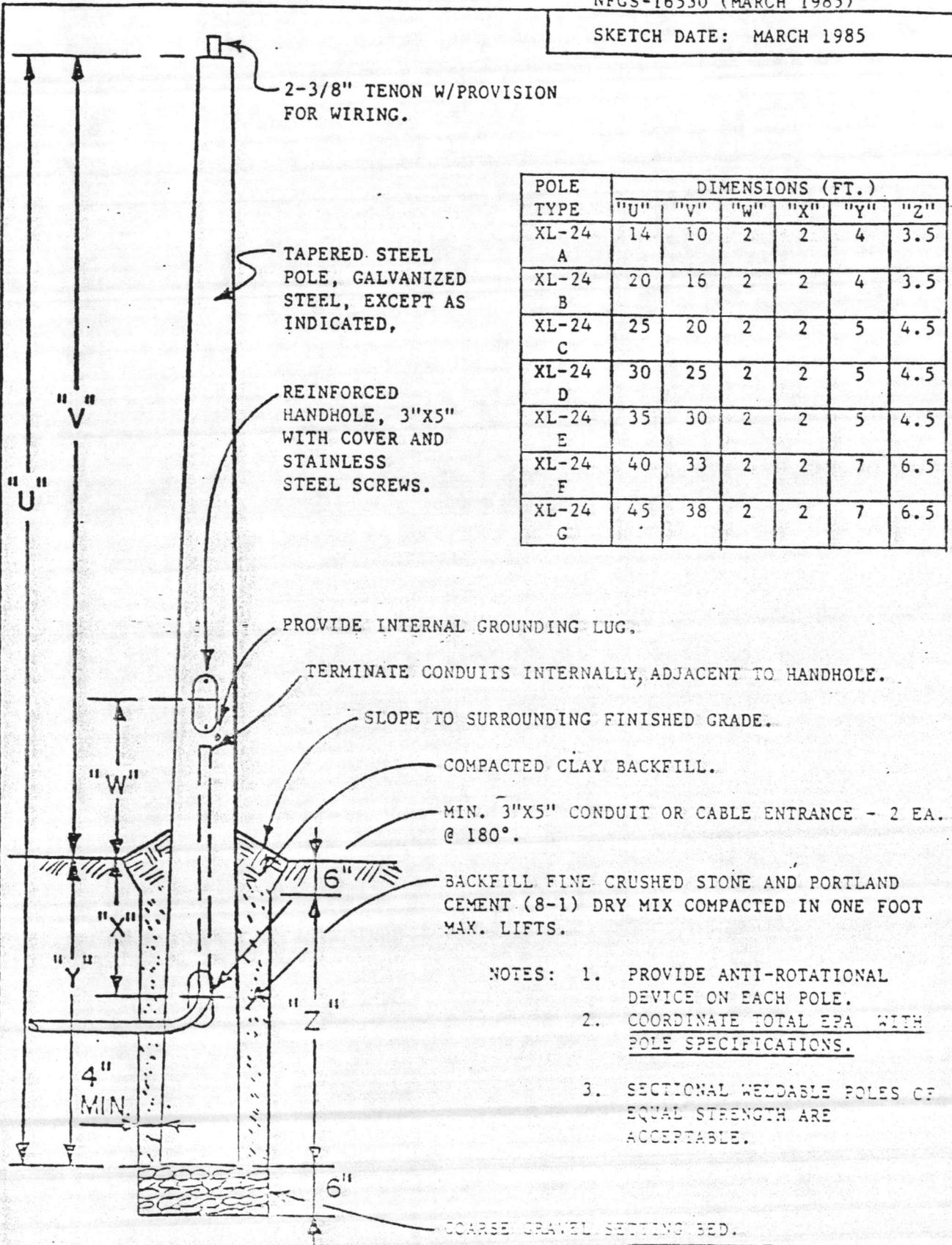
XL-23



DO NOT INCLUDE IN PROJECT SPECIFICATION
BUT INCLUDE IN DRAWINGS.

NFGS-16530 (MARCH 1985)

SKETCH DATE: MARCH 1985



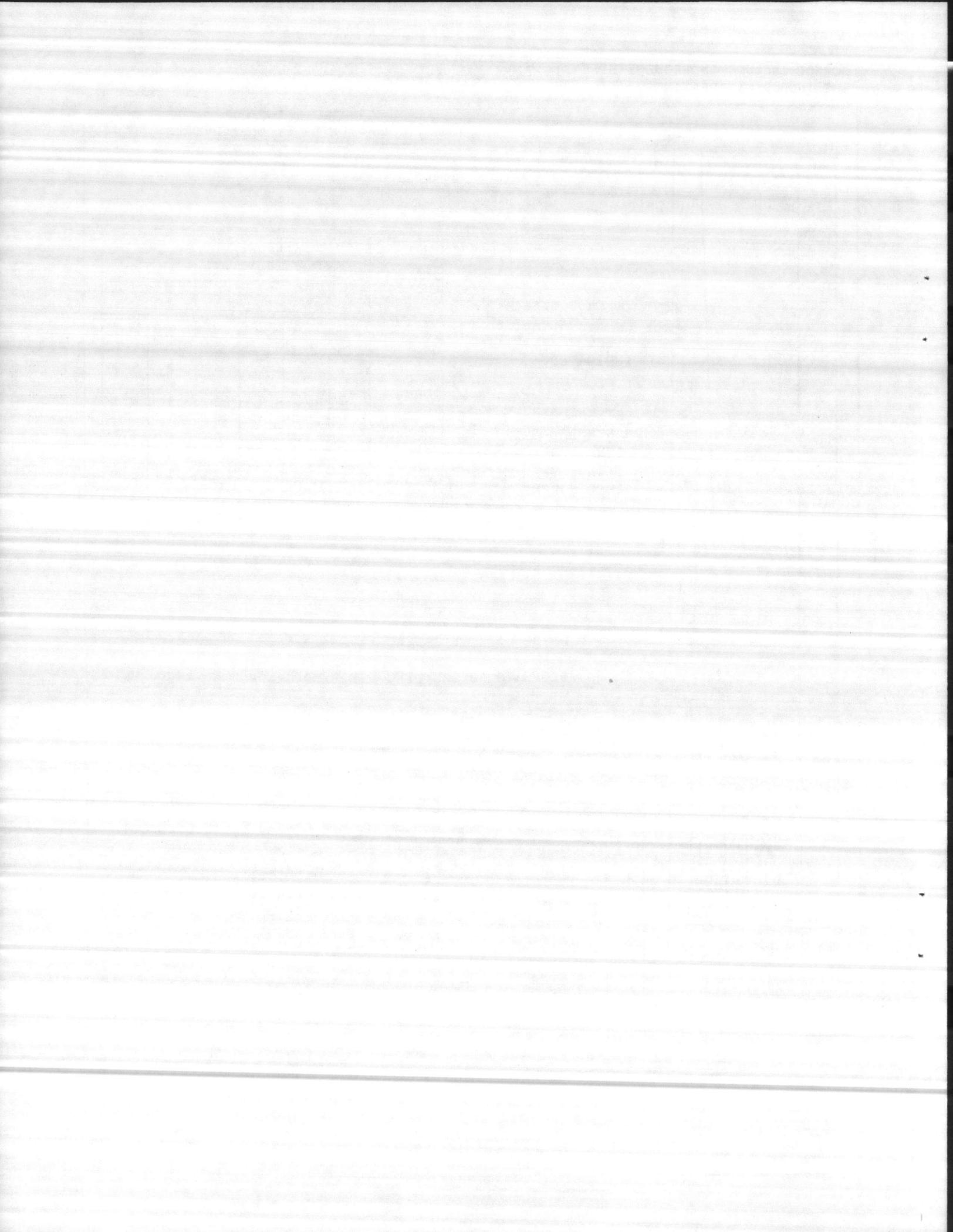
POLE TYPE	DIMENSIONS (FT.)					
	"U"	"V"	"W"	"X"	"Y"	"Z"
XL-24 A	14	10	2	2	4	3.5
XL-24 B	20	16	2	2	4	3.5
XL-24 C	25	20	2	2	5	4.5
XL-24 D	30	25	2	2	5	4.5
XL-24 E	35	30	2	2	5	4.5
XL-24 F	40	33	2	2	7	6.5
XL-24 G	45	38	2	2	7	6.5

- NOTES:
1. PROVIDE ANTI-ROTATIONAL DEVICE ON EACH POLE.
 2. COORDINATE TOTAL EPA WITH POLE SPECIFICATIONS.
 3. SECTIONAL WELDABLE POLES OF EQUAL STRENGTH ARE ACCEPTABLE.

STEEL POLE, DIRECT SET TENON MOUNT

SKETCH 16530-24

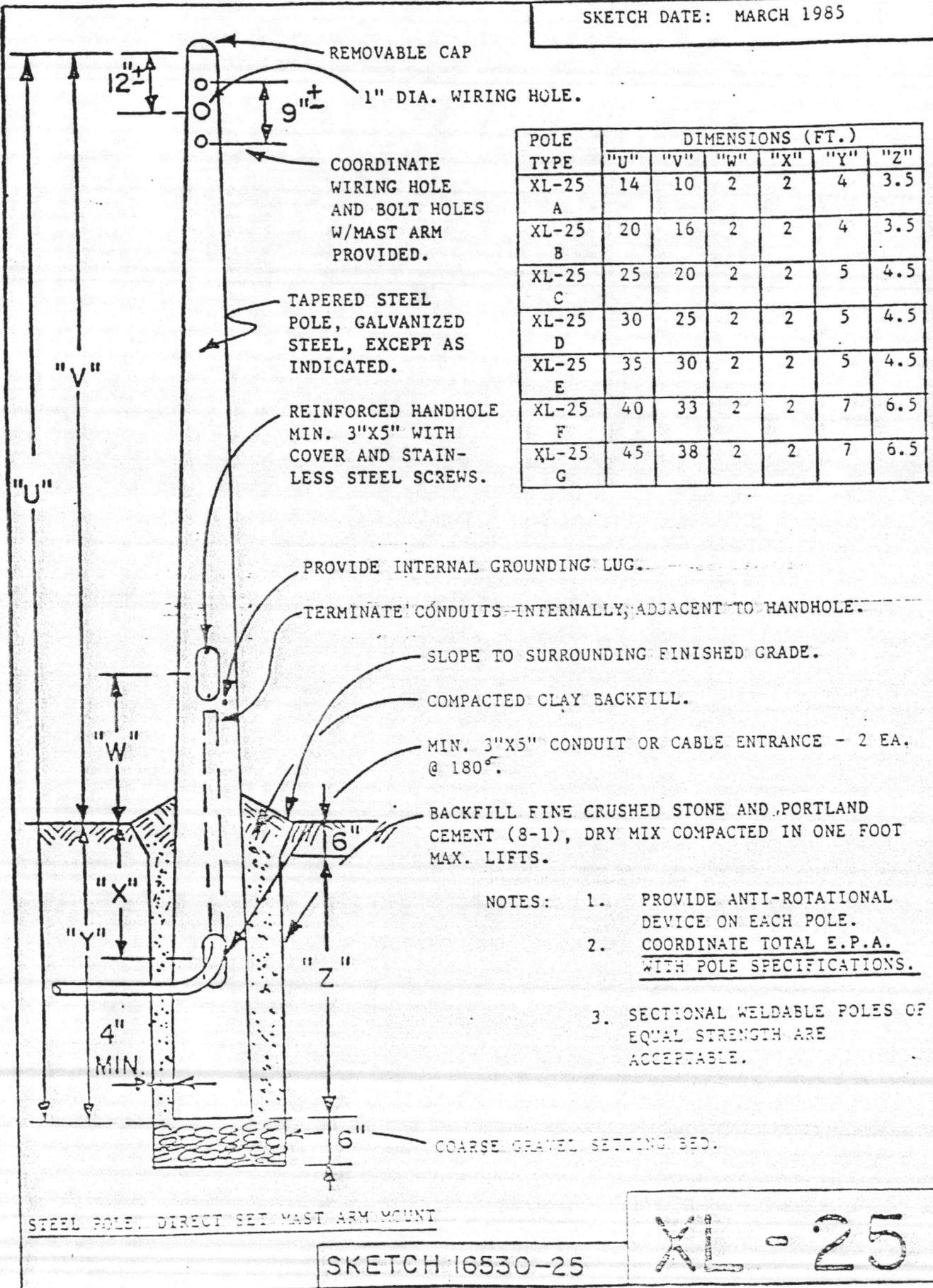
XL-24



DO NOT INCLUDE IN PROJECT SPECIFICATION
BUT INCLUDE IN DRAWINGS.

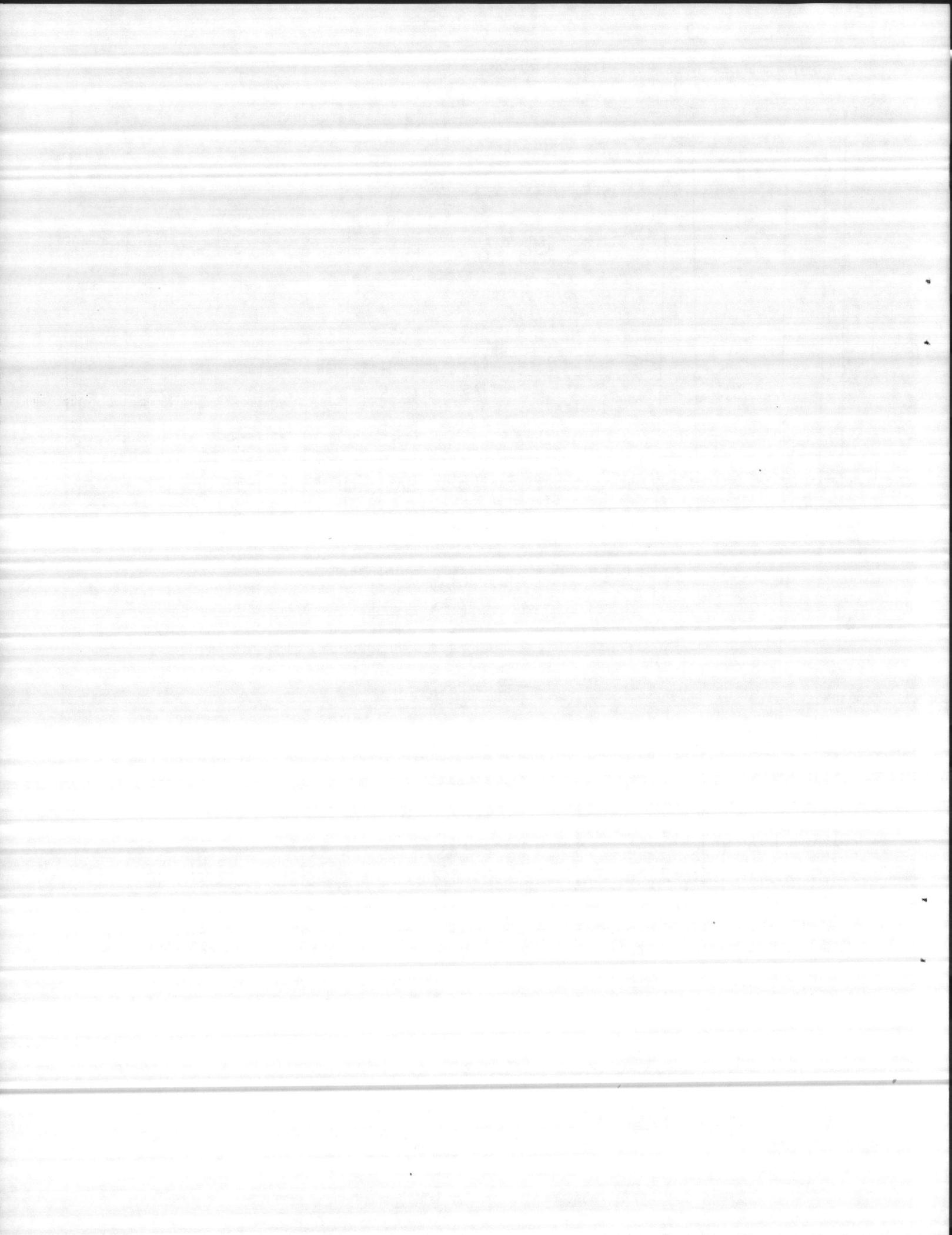
NFGS-16530 (MARCH 1985)

SKETCH DATE: MARCH 1985



SKETCH 16530-25

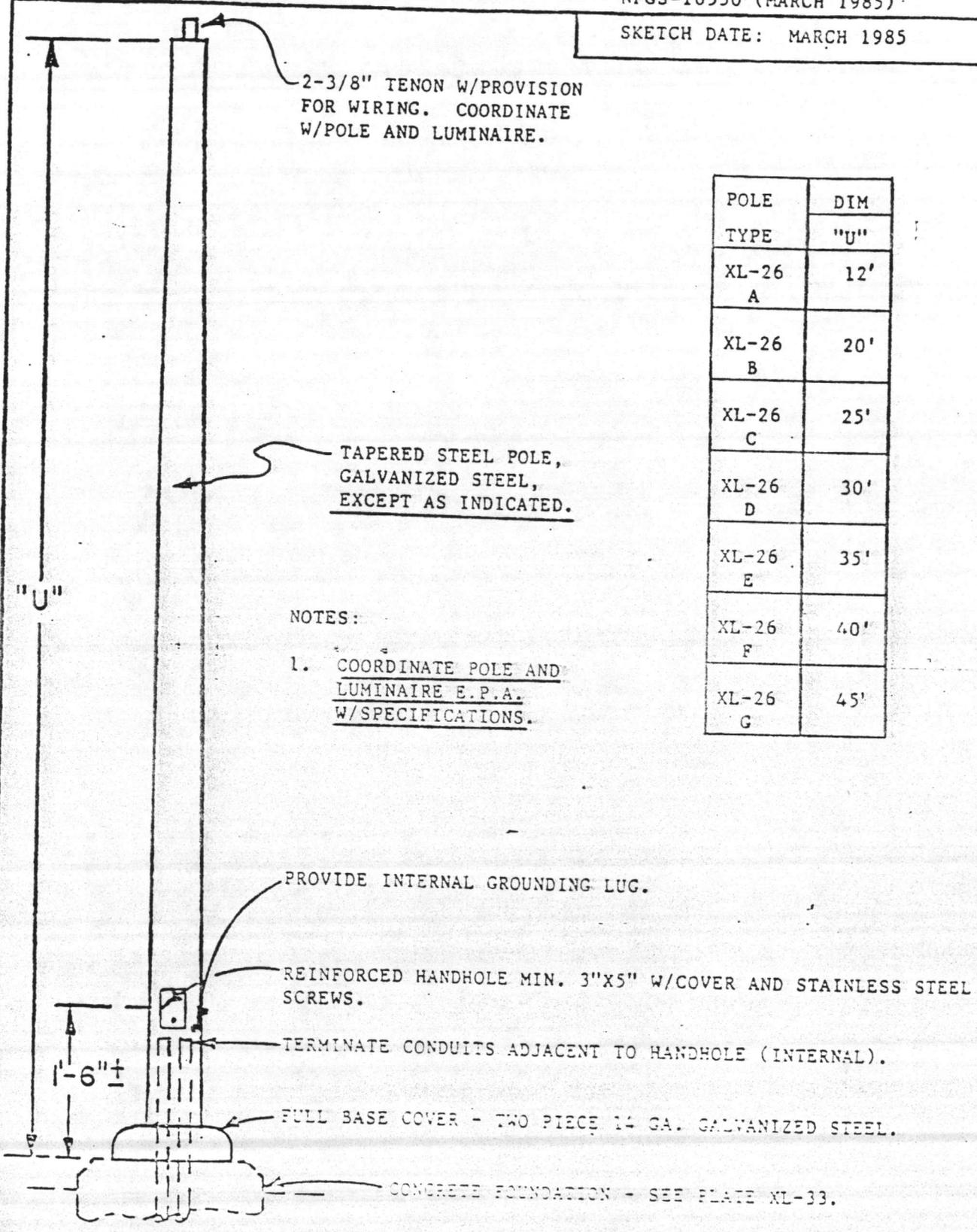
XL-25



DO NOT INCLUDE IN PROJECT SPECIFICATION
BUT INCLUDE IN DRAWINGS.

NFGS-16530 (MARCH 1985)

SKETCH DATE: MARCH 1985



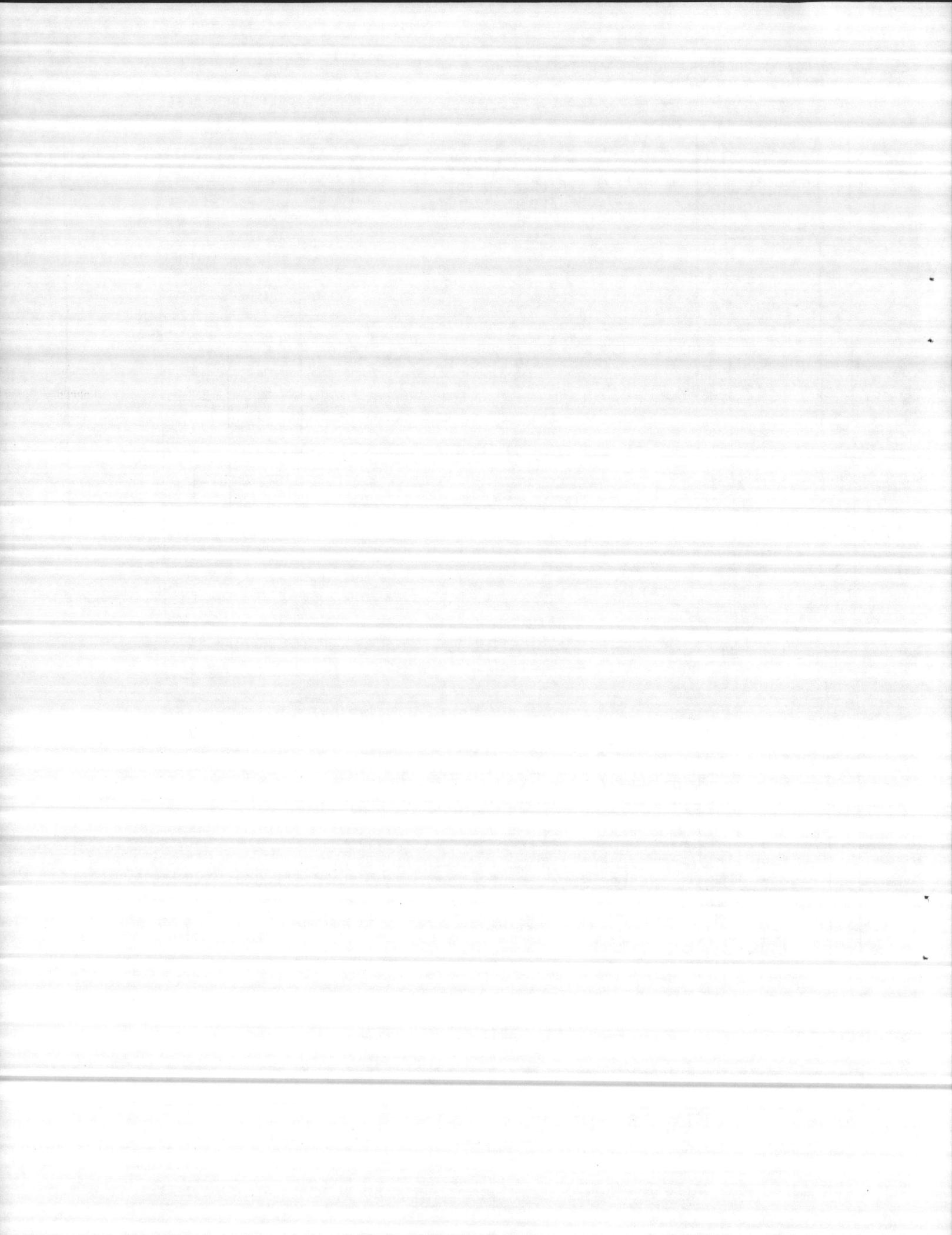
POLE TYPE	DIM "U"
XL-26 A	12'
XL-26 B	20'
XL-26 C	25'
XL-26 D	30'
XL-26 E	35'
XL-26 F	40'
XL-26 G	45'

- NOTES:
- COORDINATE POLE AND LUMINAIRE E.P.A. W/SPECIFICATIONS.

STEEL POLE, ANCHOR BASE, TENON MOUNT

SKETCH 16530-26

XL-26



DO NOT INCLUDE IN PROJECT SPECIFICATION
BUT INCLUDE IN DRAWINGS.

NFGS-16530 (MARCH 1985)

SKETCH DATE: MARCH 1985

REMOVABLE POLE CAP

12"±

9"±

1" DIA.
WIRING
HOLE

LUMINAIRE MOUNTING.
ARM BOLT HOLES COORDINATE
WIRING AND BOLT HOLES
W/MAST ARM PROVIDED.

TAPERED STEEL POLE,
GALVANIZED STEEL,
EXCEPT AS INDICATED.

"U"

NOTES:

1. COORDINATE POLE AND LUMINAIRE E.P.A. W/SPECIFICATIONS.

POLE TYPE	DIM "U"
XL-27 A	12'
XL-27 B	20'
XL-27 C	25'
XL-27 D	30'
XL-27 E	35'
XL-27 F	40'
XL-27 G	45'

PROVIDE INTERNAL GROUNDING LUG.

REINFORCED HANDHOLE MIN. 3"X5" W/COVER AND STAINLESS STEEL SCREWS.

TERMINATE CONDUITS ADJACENT TO HANDHOLE (INTERNAL).

1'-6"±

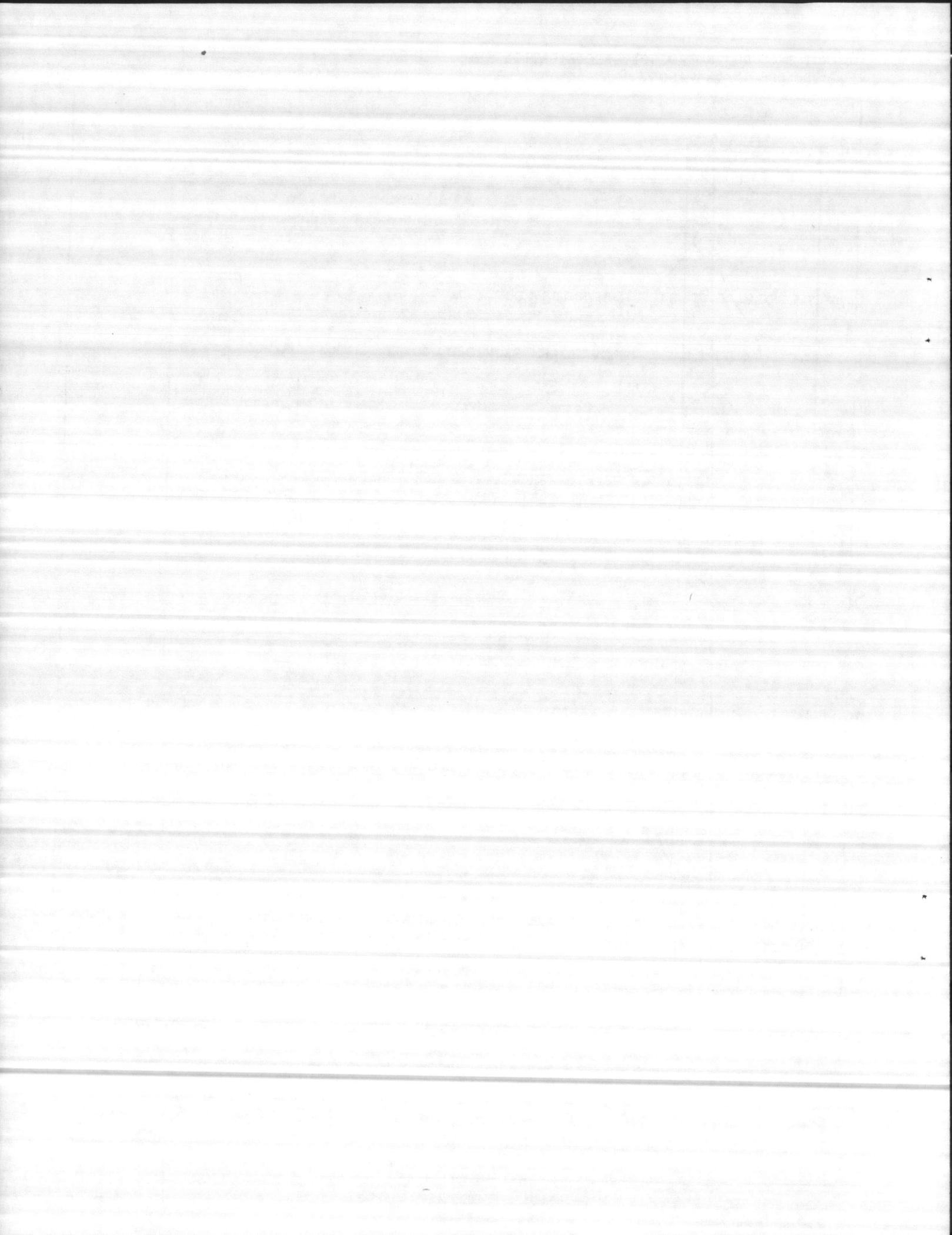
FULL BASE COVER - TWO PIECE 14 GA. GALVANIZED STEEL.

CONCRETE FOUNDATION - SEE PLATE XL-23.

STEEL POLE, ANCHOR BASE, MASTARM MOUNT

SKETCH 16530-27

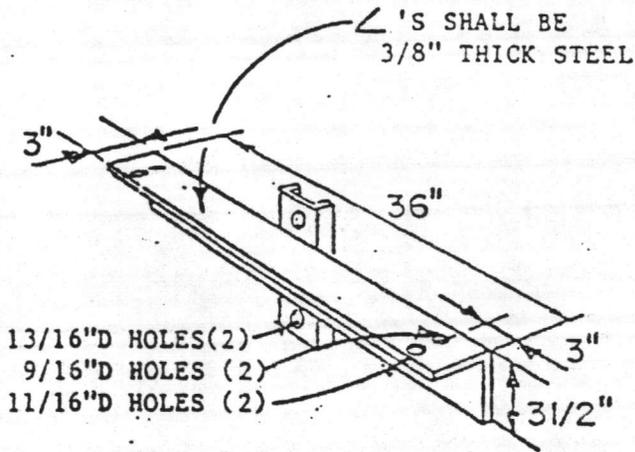
XL-27



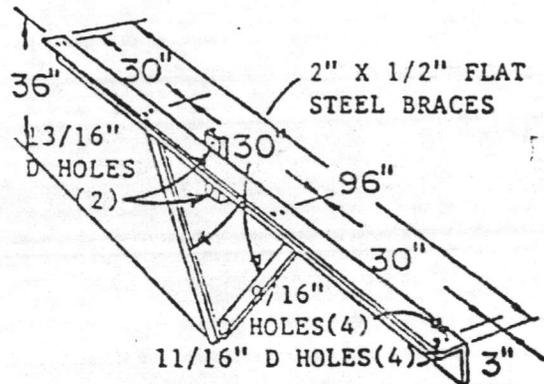
DO NOT INCLUDE IN PROJECT SPECIFICATION
BUT INCLUDE IN DRAWINGS.

NFGS 16530 (MARCH 1985)

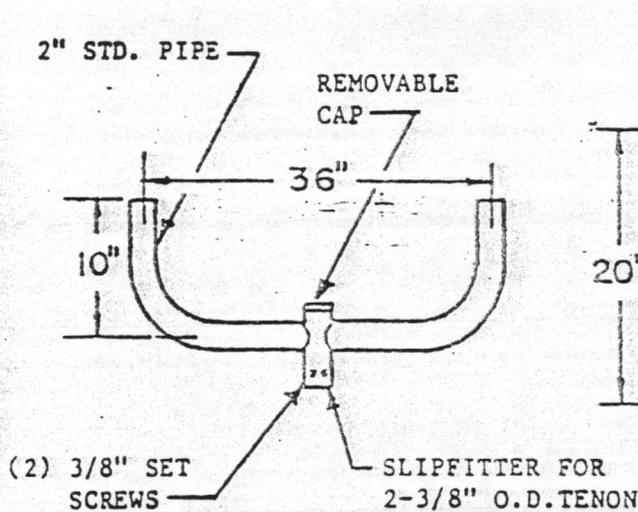
SKETCH DATE: MARCH 1985



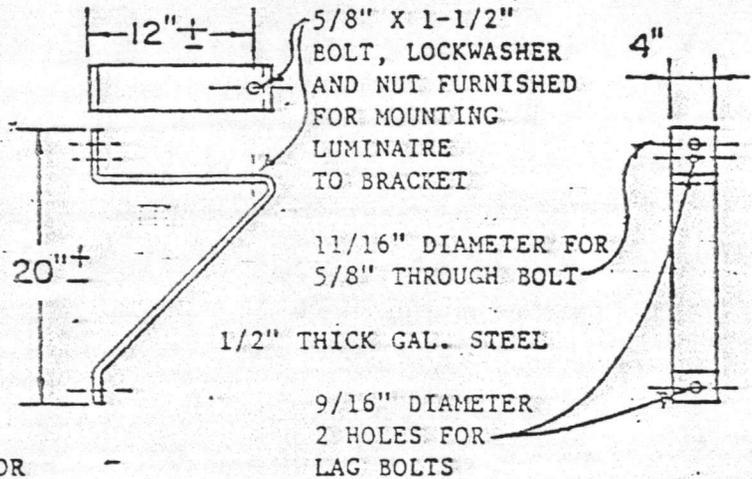
TWO LUMINAIRE MOUNTING BRACKET - "A"



FOUR LUMINAIRE MOUNTING BRACKET - "B"



TWO LUMINAIRE PIPE MOUNTING BRACKET - "C"



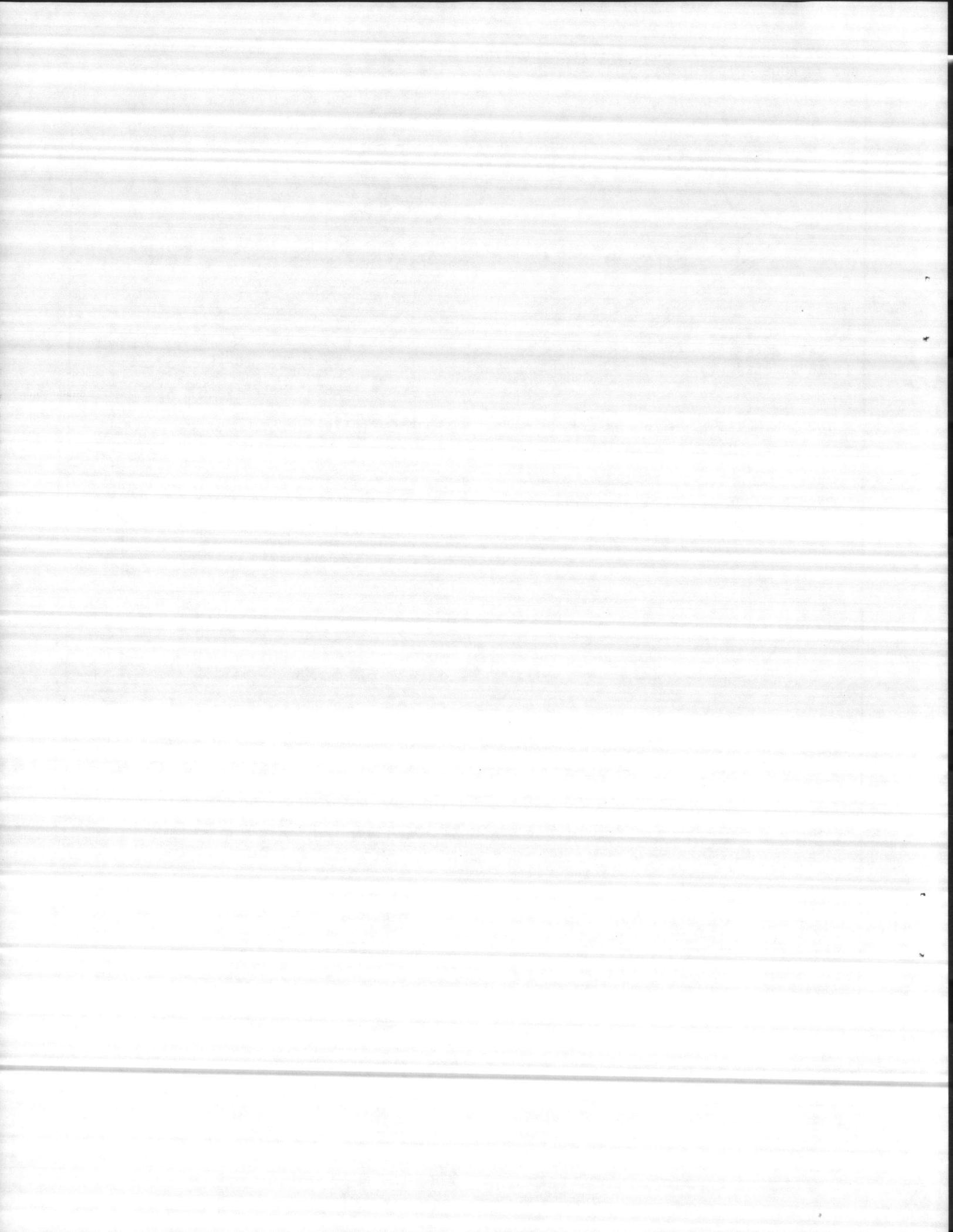
STEEL ANGLE SINGLE LUMINAIRE MOUNTING BRACKET - FOR WALL OR POLE - "D"

- NOTES: 1. ALL MATERIALS SHOWN ON THIS SHEET SHALL BE HOT-DIP GALVANIZED.
2. PROVIDE BOLTS AND OTHER HARDWARE AS REQUIRED.

LUMINAIRE MOUNTING BRACKETS

SKETCH 16530-28

XL - 28



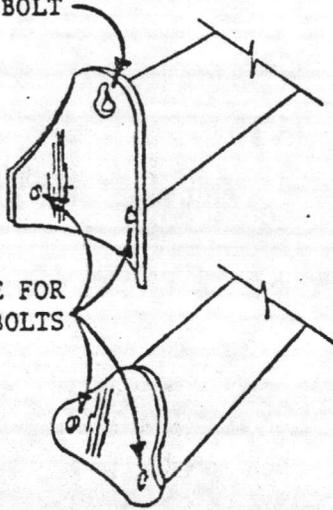
DO NOT INCLUDE IN PROJECT SPECIFICATION
BUT INCLUDE IN DRAWINGS.

NFGS-16530 (MARCH 1985)

SKETCH DATE: MARCH 1985

KEYHOLE SLOT FOR
5/8" THRU BOLT

5/16" HOLE FOR
1/2" LAG BOLTS



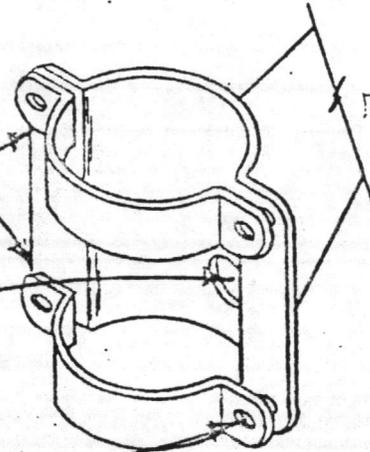
MOUNTING PLATE FOR TRUSS
MEMBER TAPERED ELLIPTICAL ARM

"A"

BACK-UP
CLAMPS

1-1/4" WIRE
ENTRANCE HOLE

9/16" HOLE FOR
1/2" X 1-3/4"
STAINLESS STEEL
BOLTS

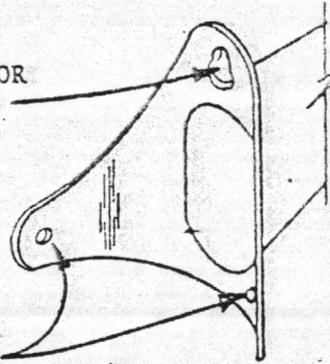


MOUNTING PLATE FOR SINGLE
MEMBER TAPERED ELLIPTICAL ARM

"B"

KEYHOLE SLOT FOR
5/8" THRU BOLT

9/16" HOLE FOR
1/2" LAG BOLTS



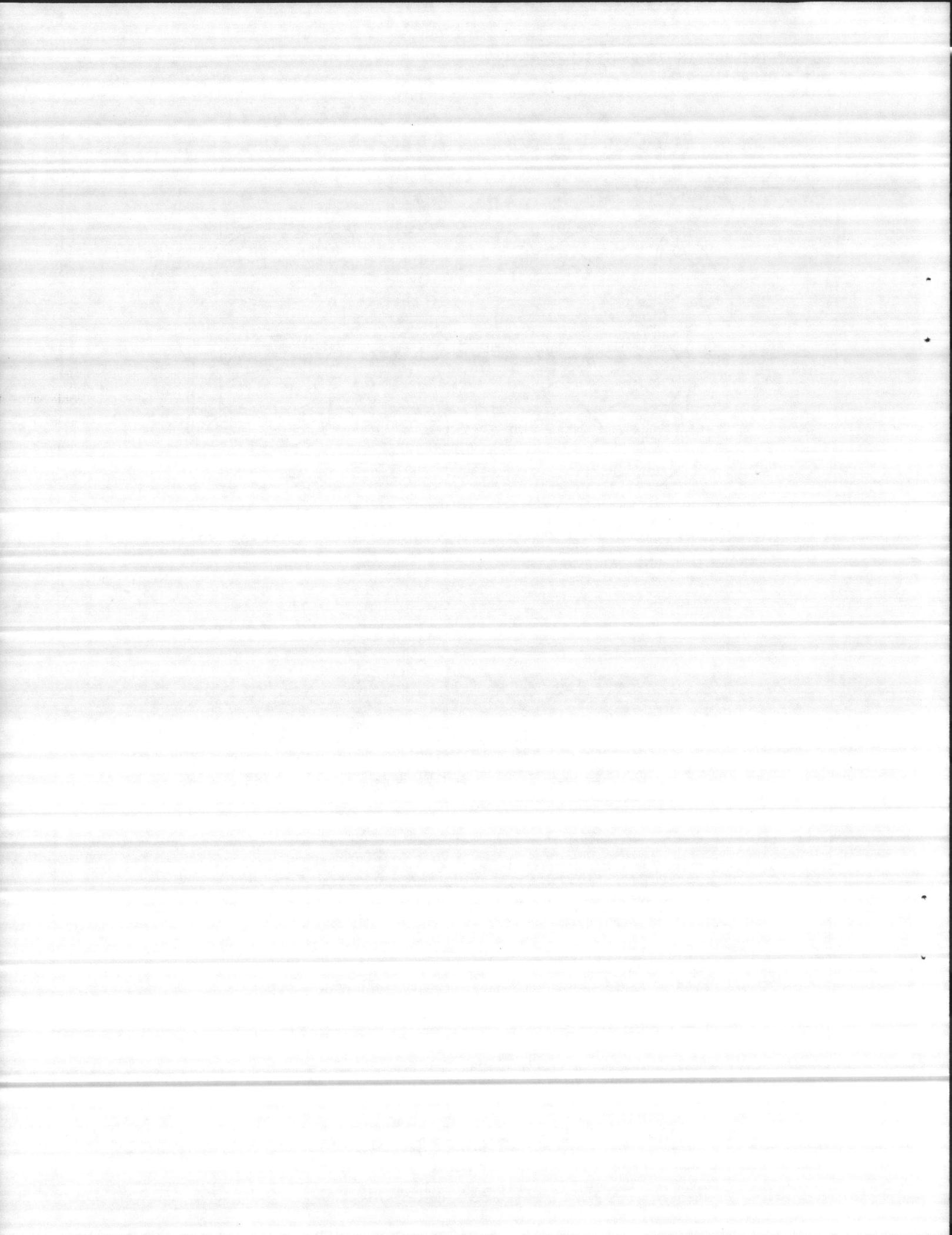
MOUNTING PLATE FOR SINGLE
MEMBER TAPERED ELLIPTICAL ARM

"C"

VARIOUS LUMINAIRE MOUNTING ARM TYPES

SKETCH 16530-29

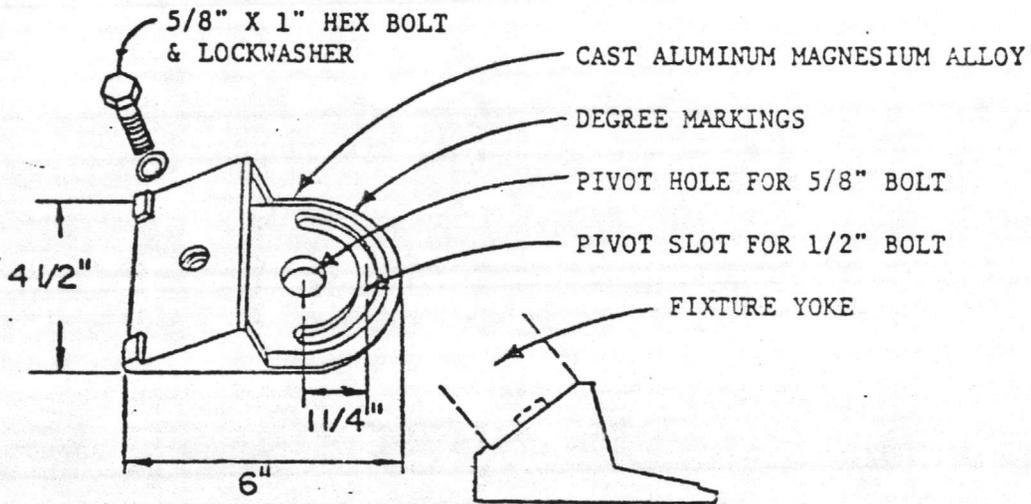
XL - 29



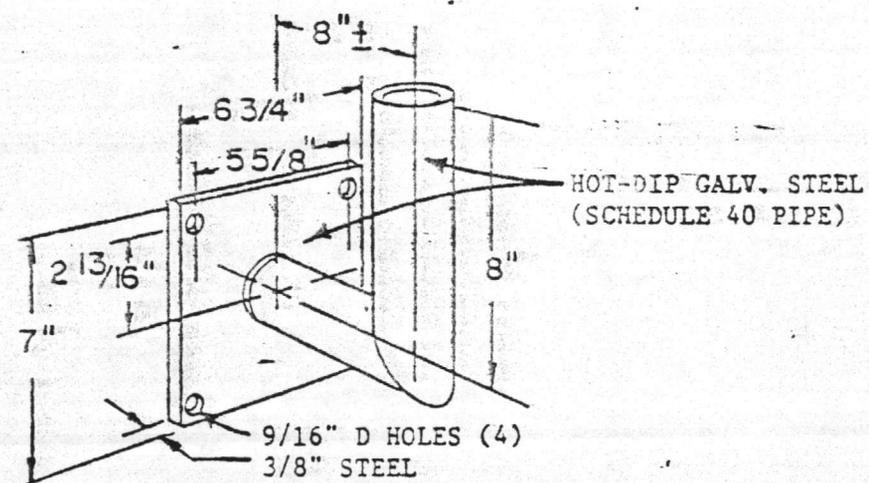
DO NOT INCLUDE IN PROJECT SPECIFICATION
BUT INCLUDE IN DRAWINGS.

NTGS-16530 (MARCH 1985)

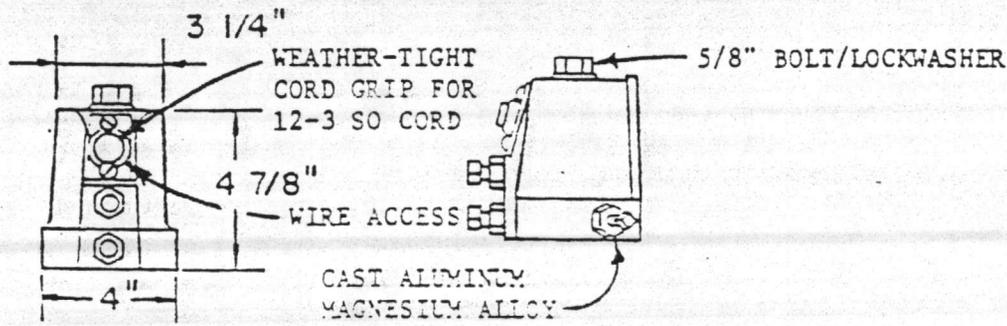
SKETCH DATE: MARCH 1985



45° CROSSARM ADAPTOR - "D"



RIGHT ANGLE BRACKET - "E"

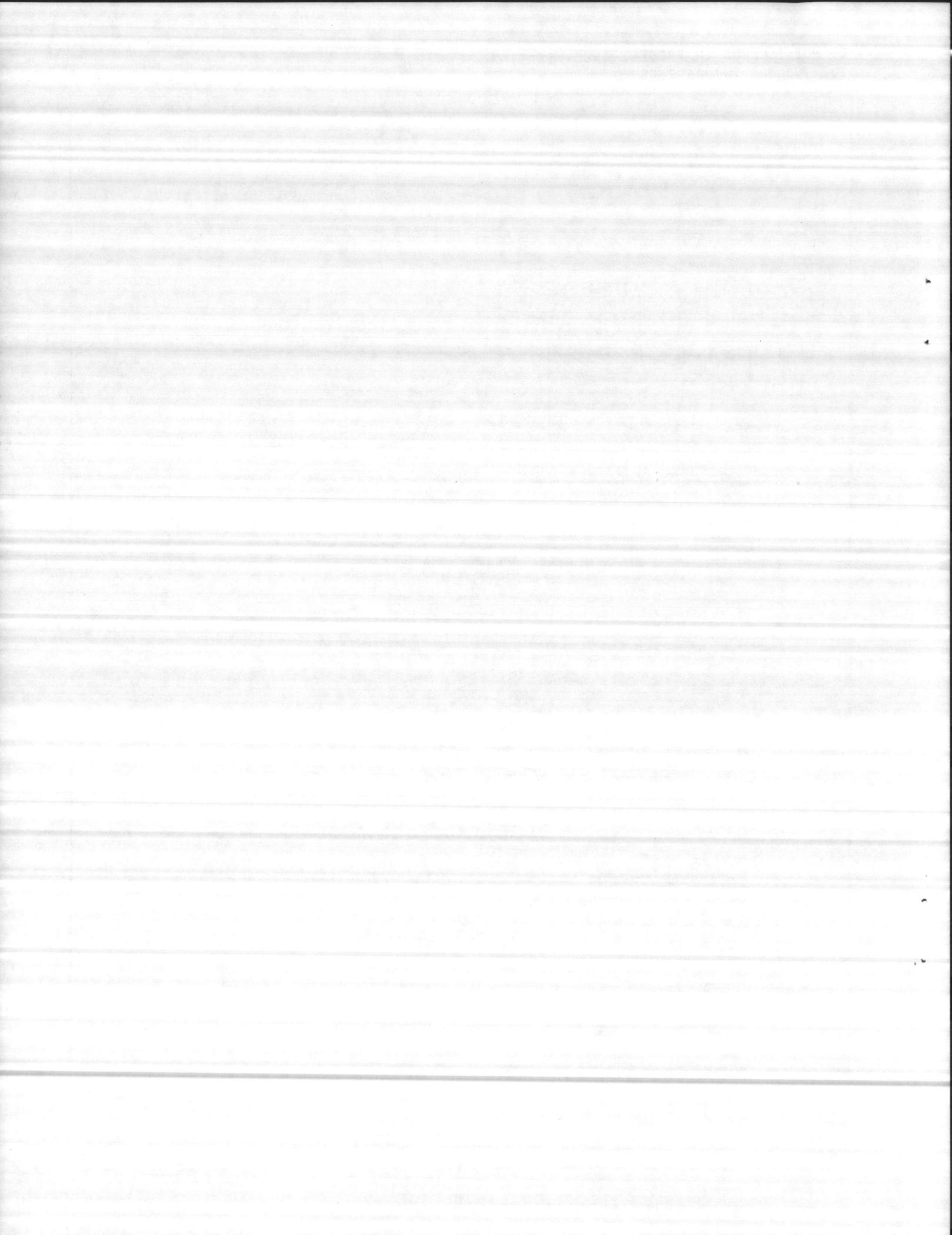


YOKE SLIPFITTER - "F"

MISCELLANEOUS LUMINAIRE MOUNTING BRACKETS

SKETCH 16530-30

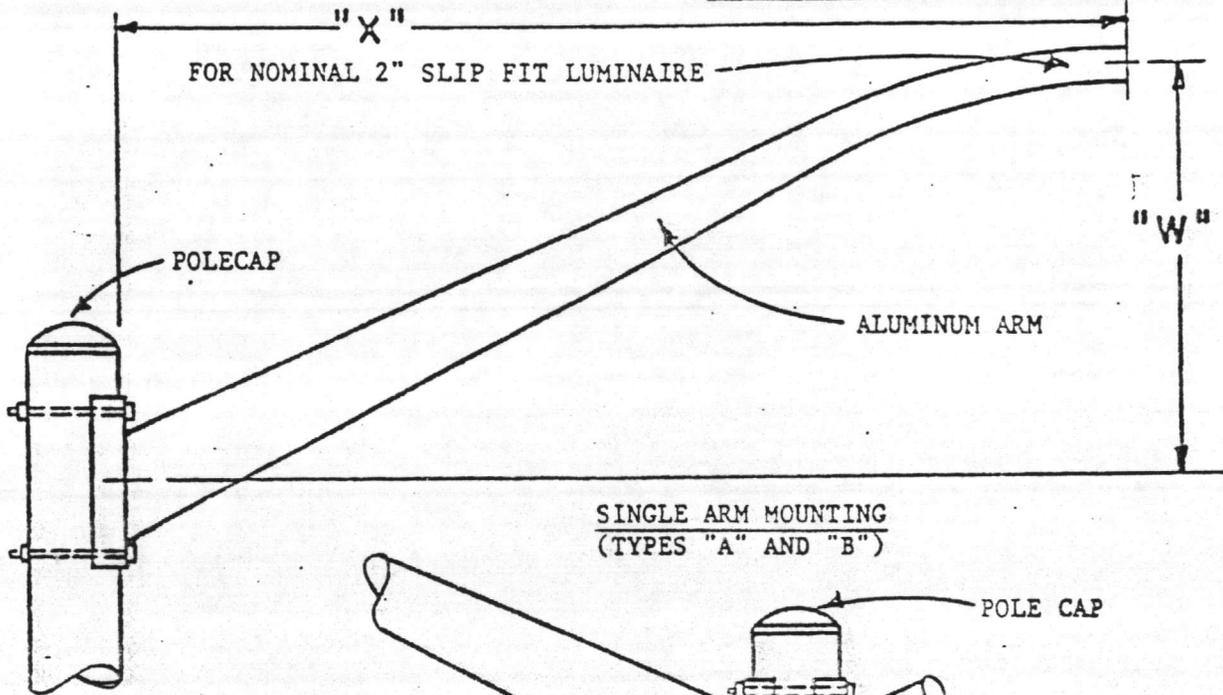
XL - 30



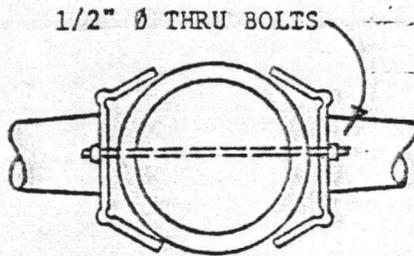
DO NOT INCLUDE IN PROJECT SPECIFICATION
BUT INCLUDE IN DRAWINGS.

NFGS-16530 (MARCH 1985)

SKETCH DATE: MARCH 1985

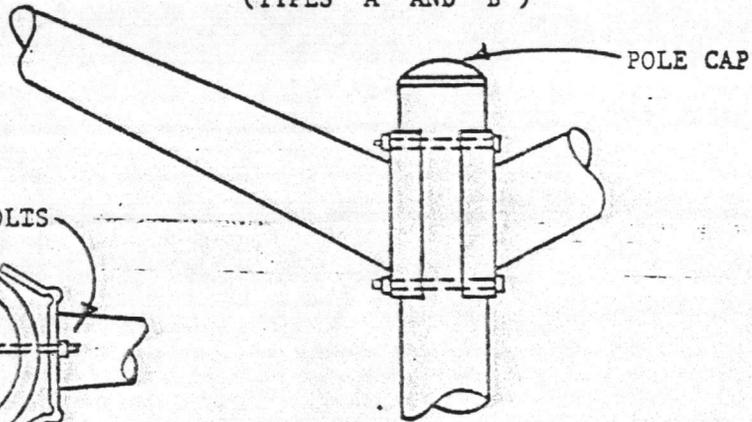


SINGLE ARM MOUNTING
(TYPES "A" AND "B")

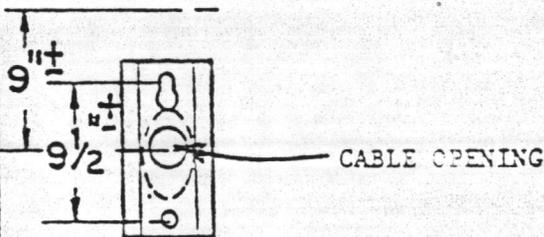


1/2" Ø THRU BOLTS

PLAN



DOUBLE ARM MOUNTING
(TYPES "C" AND "D")



MOUNTING PLATE

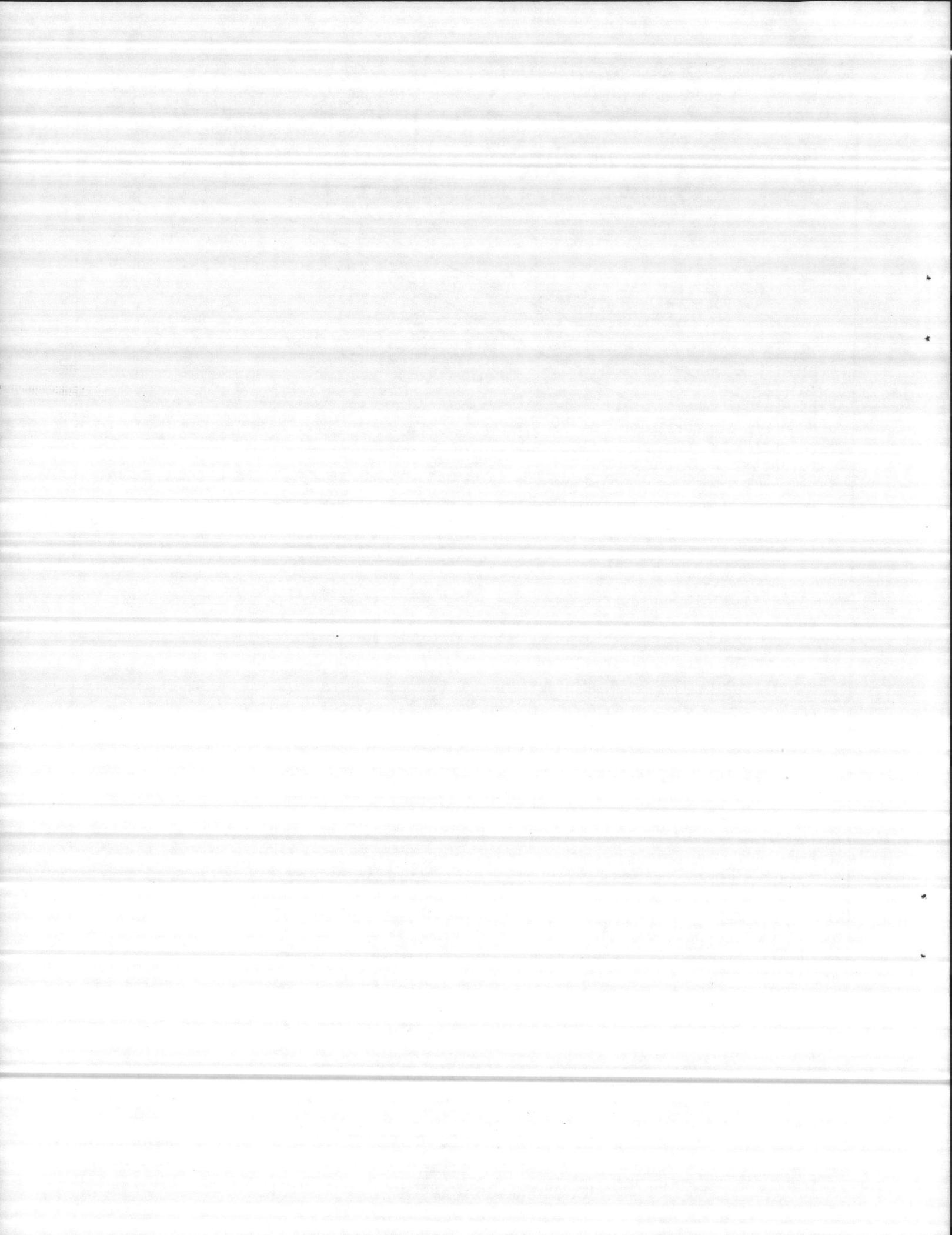
MOUNTING ARM DIMENSIONS		
TYPE	"W" (NOM)	"X" (NOM)
XL-26, A	48"	15"
XL-26, B	72"	24"
XL-26, C	48"	15"
XL-26, D	72"	24"

NOTE: ALL MOUNTING HARDWARE FOR ARMS
SHALL BE HOT-DIP GALVANIZED.

LUMINAIRE MOUNTING ARMS

SKETCH 16530-31

XL-31

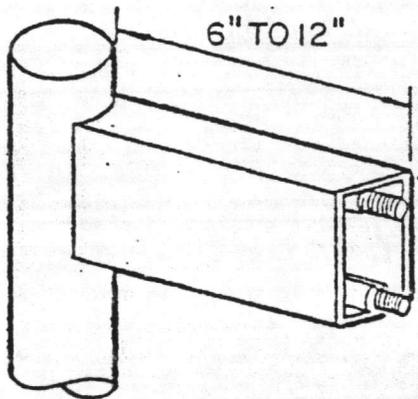


DO NOT INCLUDE IN PROJECT SPECIFICATION
BUT INCLUDE IN DRAWINGS.

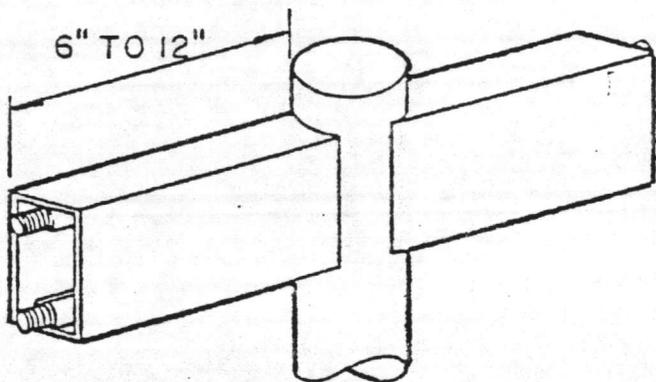
NFGS-16530 (MARCH 1985)

SKETCH DATE: MARCH 1985

RECTANGULAR ALUMINUM EXTRUSION,
APPROXIMATELY 2-1/2" X 5" (TYPICAL)

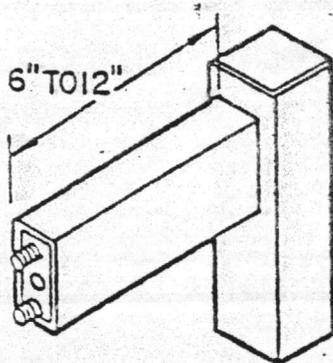


SINGLE ARM MOUNTING - "A"



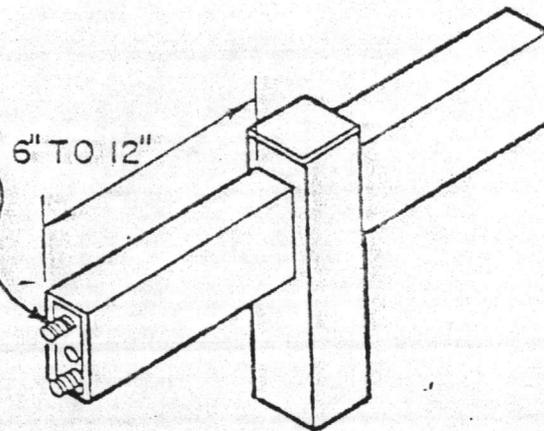
DOUBLE ARM MOUNTING - "B"

ROUND POLE MOUNTING



SINGLE ARM MOUNTING - "C"

1/2" Ø THREADED
RODS. (TYPICAL)



DOUBLE ARM MOUNTING - "D"

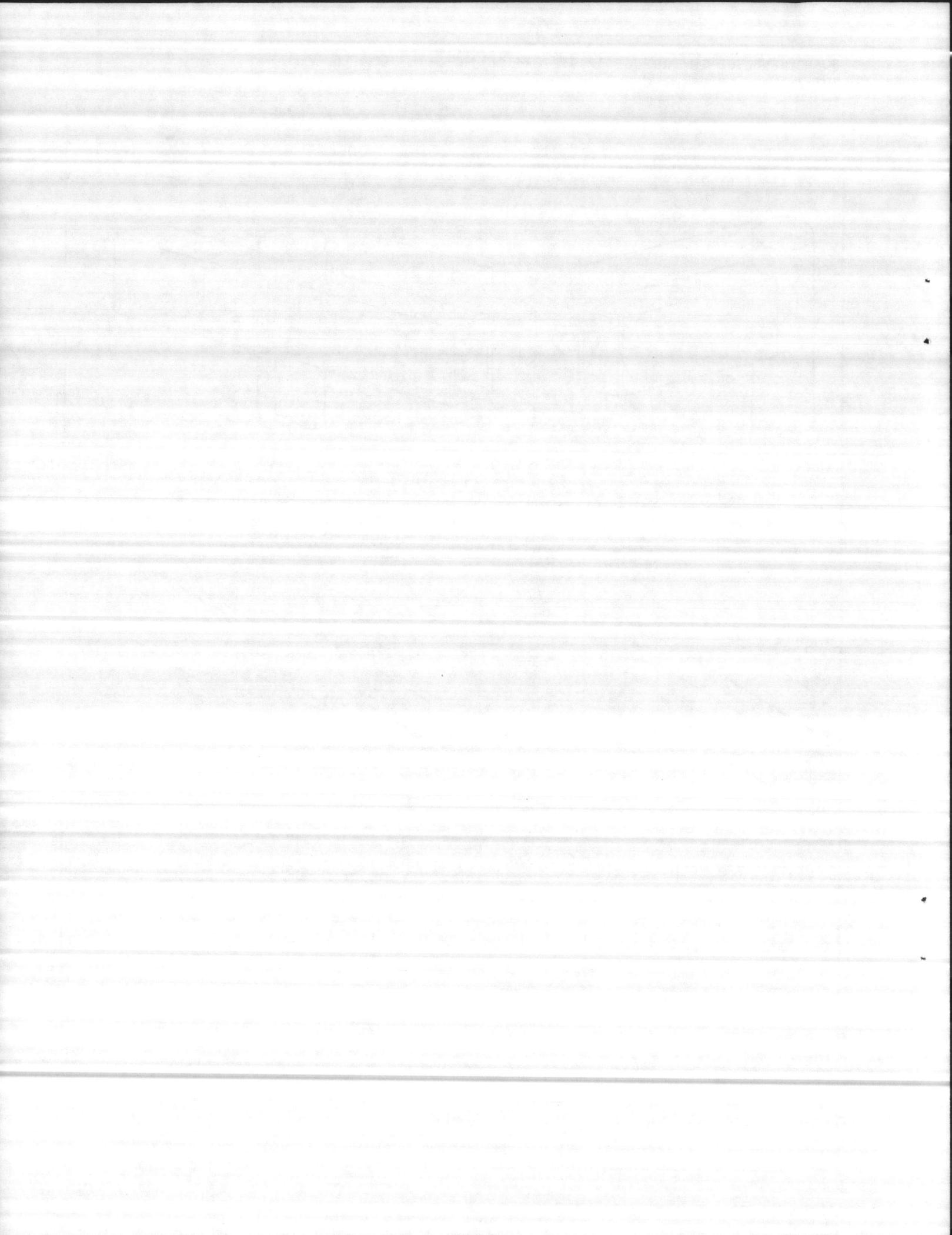
SQUARE MOUNTING ARMS

NOTES: 1. ALL FASTENERS SHALL BE CONCEALED.

LUMINAIRE MOUNTING ARMS

SKETCH 16530-32

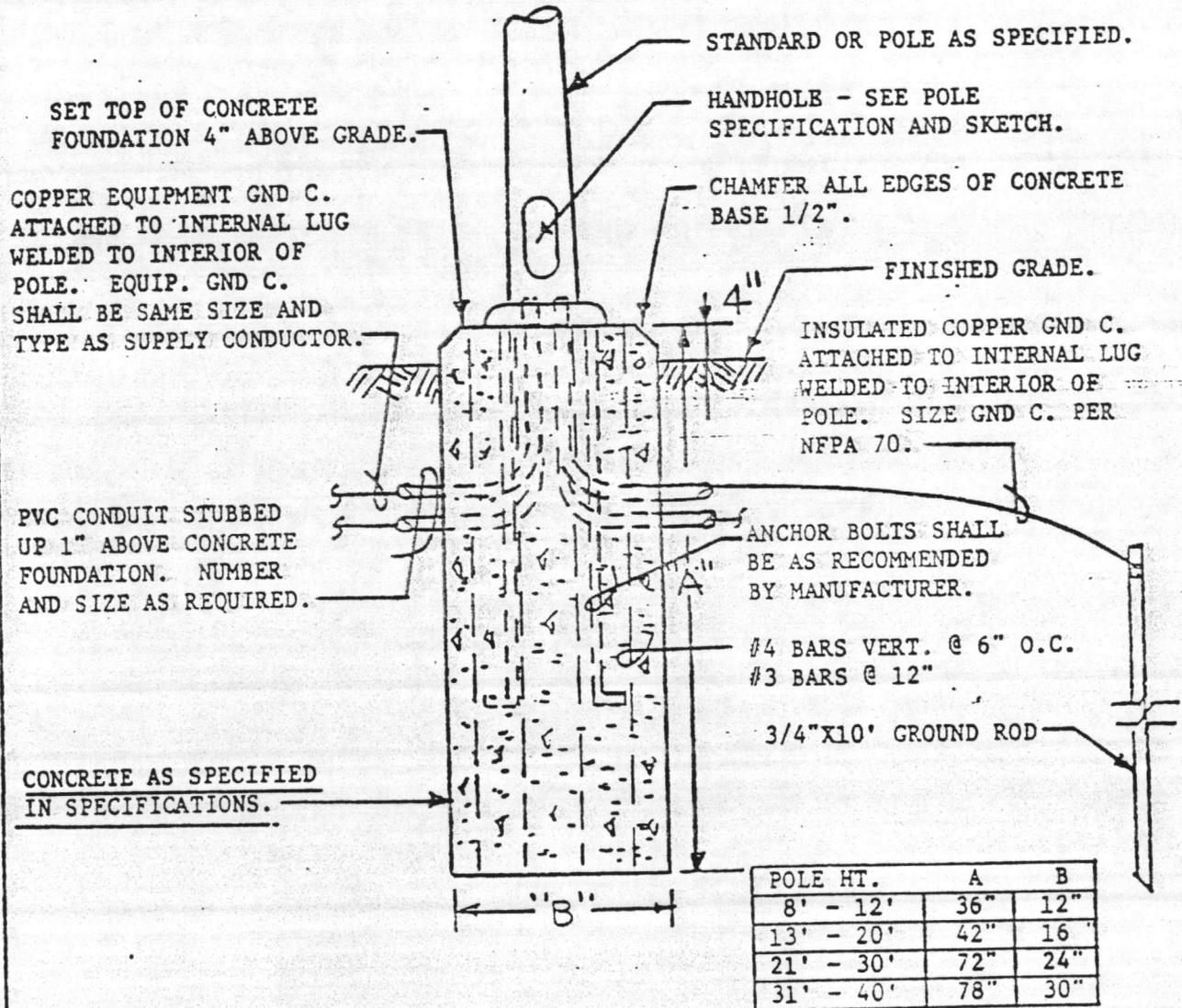
XL-32



DO NOT INCLUDE IN PROJECT SPECIFICATION
BUT INCLUDE IN DRAWINGS.

NFGS-16530 (MARCH 1985)

SKETCH DATE: MARCH 1985



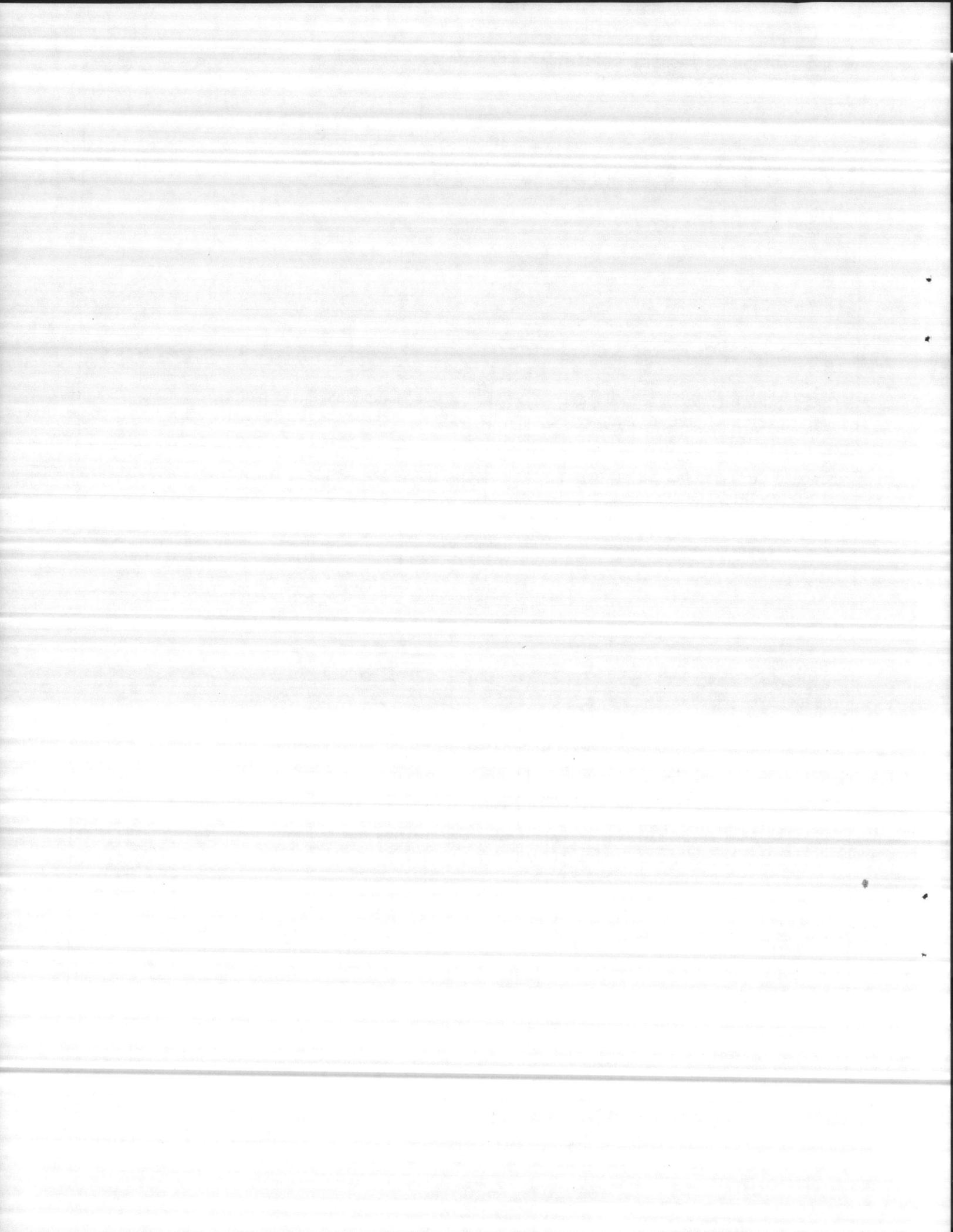
"BOLT DOWN" - POLE FOUNDATION

LEGEND

GND C. - GROUNDING CONDUCTOR
O.C. - ON CENTER

SKETCH 16530-33

XL-33



LIGHTING FIXTURE SCHEDULE

FIXTURE SYMBOL.	SEE NAVFAC SKETCH OR DETAIL ON PLANS	NUMBER AND TYPE LAMP	VOLTAGE	MOUNTING	REMARKS
▲ A	XL-9	1-70 W HPS	208	ON XL-21, C POLE	
▲ B	XL-1 ON "XL-32B" HDWE	2-150 W HPS	208	ON XL-21, D POLE	W/PHOTO CELL
▲ C	XL-2 ON XL-28-A	2-150 W HPS	208	ON XL-23, D POLE	
▲ D	DETAIL. "A" - SHEET E-2	2-40 W INC.	120	ON 8' CONC. POLE	
▲ E					

SAMPLE LIGHTING FIXTURE SCHEDULE

SHOW ON LIGHTING PLAN

DO NOT INCLUDE IN PROJECT SPECIFICATION
BUT INCLUDE IN DRAWINGS.

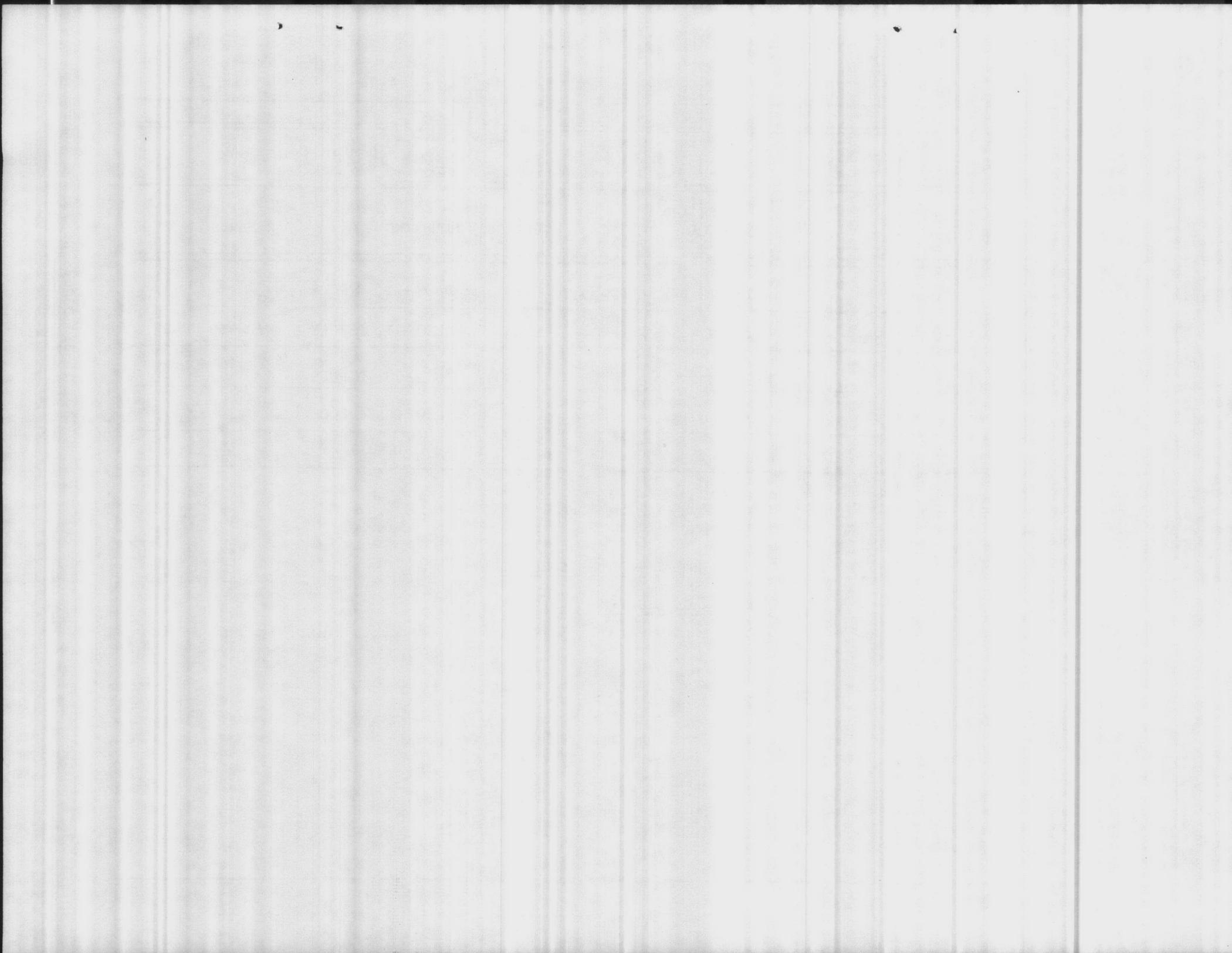
NFGS-16530 (MARCH 1985)

SKETCH DATE: MARCH 1985

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SKETCH 16530-99

XL-99



CRITERIA NOTES

NOTE A: The following information shall be shown on the drawings or specified in the project specifications:

- a. Type of luminaire.
- b. Voltage, wattage, and frequency rating required.
- c. Accessories required, such as photocell, time switches, and auxiliary lamps.
- d. Location of poles or standards.
- e. Applicable sketch referenced.

NOTE B: As an exception to what may normally be specified, lens and refractors of acrylic or polycarbonate plastic should be specified if secondary damage by the breakage of a refractor cannot be tolerated. Some plastic refractors are subject to yellowing and in general are not as desirable as glass refractors. Of the plastics, acrylic plastic refractors offer the most desirable properties. If vandalism is a serious problem, polycarbonate plastic refractors are less susceptible to breakage but are susceptible to yellowing after a relatively short period of time. Other types of plastic refractors are available and should be investigated for special applications. Do not use metal-halide lamps without a tempered glass diffuser.

NOTE C: Coordinating HPS lamp and ballast characteristics is important for proper operation, maximum light output, and optimum lamp life. See Criteria Note E for more details. Lamp current crest factor and maximum peak voltage across lamp terminals are particularly important characteristics. For 150-watt HPS lamps, use ANSI C78.1355 in lieu of ANSI C78.1356. ANSI C78.1355 is a DOD adopted standard; most luminaires use the 55-volt lamp as standard. Maintenance personnel can eliminate stocking and relamping problems if all 150-watt lamps are 55 volts.

NOTE D: High power-factor, regulating type ballasts should be used in all available sizes. Ballasts for HPS lamps must maintain the lamp wattage variations within the limits of the ANSI trapezoid for the specific lamp throughout the designed input voltage limits. A ballast characteristics curve should preferably be such that the lamp wattage attains a maximum at or below the maximum lamp voltage line

SPECS-IN-TACT

and then decreases substantially as the lamp voltage increases beyond this point. A relatively flat ballast characteristic curve located near the line of rated lamp wattage is also preferable to one that rises or falls relatively steeply. This is a requirement of ANSI C82.4. Leave in last two sentences of paragraph when specifying HPS ballasts.

NOTE E: Photocells and time switches should not always be used together. Use the following information as a guide.

- | | |
|--|--|
| a. Lights on/lights off by photocell | Street lighting and certain parking lots. Any facility or street that requires lighting after dark. |
| b. Lights on by photocell; lights off by time switch | Most administration facilities, commissaries, hobby shops, or clubs. Any facility that does not stay open all night. |
| c. Lights on/lights off by time switch | Service stations, snack bars, barracks, or officer's quarters. Facilities that will be open to the public, or have personnel that must report before daylight and after dark, but not all night. |

Other considerations: Time switches with skip-a-day feature may be useful for facilities with a 5-day work week. (Program time switch to skip Saturday and Sunday.) For facilities that do not stay open all night, it may be desirable to have lighting at night for security. Consult area Engineering Field Division for local station policy and exceptions to these suggestions.

NOTE F: Suggestions for improvement of this specification will be welcomed. Complete the attached DD Form 1426 and mail the original to:

COMMANDER
Naval Facilities Engineering Command
Atlantic Division, Code 406C
Norfolk, Virginia 23511-6287

SPECS-IN-TACT

Mail a copy to:

COMMANDER
Naval Facilities Engineering Command
Code DSO2
200 Stovall Street
Alexandria, VA 22332-2300

--End--

-- End of Section --

